# INFANT FEEDING PRACTICES AND PERCEPTIONS

## A study in Mangochi Township and Lungwena rural community in Mangochi district, Malawi

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# ABSTRACT

***Background***

Childhood malnutrition, an important risk factor for child mortality, has been a major health problem with no improvement over the last eight years in Malawi. One of the direct causes to child malnutrition is inadequate dietary intake, more often a result of inappropriate feeding practices. However, breast milk has unique nutritional characteristics hence optimum breastfeeding can avert the risk of malnutrition. For developing countries where HIV is prevalent, such as Malawi, exclusive breastfeeding is the better option which is safe, feasible, and acceptable in preventing of mother-to-child-transmission. However studies looking at infant feeding practices in Malawi have not focused on maternal perceptions; or rural and urban differences, although these factors have been known to influence breastfeeding.

***Objectives***

The aim was to study breast feeding practices and perceptions in an urban and rural setting and investigate which socio-demographic factors are associated with optimum breastfeeding practices and infant's nutritional status

***Methodology***

A cross-sectional survey was conducted where 349 mothers of infants below 12 months of age were interviewed. The survey was conducted in two communities in Mangochi district; Mangochi Township, an urban area and Lungwena, a rural area. In addition weight and length of the infants were taken.

***Results***

Breastfeeding was initiated within the first hour of giving birth for 65.3% of the mothers. 98% of the interviewed mothers initiated breastfeeding without giving any pre-lacteal feeds. Only 5% of the mothers had discarded colostrum before initiating breastfeeding. Exclusive breastfeeding rates at 2, 4, 6 months were significantly different between the rural and urban area. The rates were 8.9%, 3.2%, 0.6% in the rural area and 51%, 29.2%, 5.7% in the urban area respectively. However, a higher proportion of the mothers both in the rural (17.8%) and the urban area (58.3%) perceived that infants should be breastfed exclusively until 6 months. 76% of both urban and rural mothers had the opinion that infant's crying inferred as hunger by the mother was the main reason why mothers do not breastfeed. 96% of the mothers thought that there were benefits associated with breastfeeding.

Another person had decided for nearly half of the mothers to start giving complementary feeds. Elderly family or community members were reported by 25% of the mothers as having been the person who made the decision. Health workers were reported by 60% of the mothers to be the persons who had influenced their perceptions. Almost all infants were breastfed when sick. 42.7 % of the rural and 25.3% of the urban mothers breastfed less often when sick. 88% of the mothers were aware about mother-to-child-transmission. But 30.3% of them were not aware of prevention of mother-to-child-transmission. 35.7% of the rural mothers and 22.9% of the urban mothers would still prefer to breastfeed if they were found HIV positive.

12.6% of the infants were stunted and underweight while 6.6% were wasted. The rates of stunting, being underweight or wasting were significantly higher in the rural than

the urban area; and among infants not breastfed at 4 months than those breastfed at 4 months. In multivariate analysis we found that living in the urban area, place of birth and literacy of the mother were independent predictors of exclusive breastfeeding at 4 months. While being food secure and living in the urban area were independent predictors of stunting.

***Conclusion***

Exclusive breastfeeding is not widely practised and it is more uncommon in the rural area than the urban area. There is need for more interventions focusing on breastfeeding promotion. Elderly community members can be used as an entry point for such kind of interventions. Although less of children who had been exclusively breastfed at four months were malnourished, being exclusively breastfed did not predict absence of malnutrition.

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# TABLE OF CONTENTS

# ABBREVIATIONS

| | |
|---|---|
| GNP | Gross National Product |
| MHDS | Malawi Health Demographic Survey |
| HIV | Human Immuno-defeciency Virus |
| AIDS | Acquired Human Immuno-deficiency Syndrome |
| MTCT | Mother-To-Child-Transmission |
| PMTCT | Prevention of Mother-To-Child-Transmission |
| MoHP | Ministry of Health and Population |
| CHAM | Christina Health Association of Malawi |
| UNICEF | United Nations Children Education Fund |
| WHO | World Health Organistion |
| BFHI | Baby Friendly Hospital Initiative |
| CHPS | Community Health Partnerships |
| IEC | Information, Education and Communication |
| HSA | Health Surveillance Assistant |
| DHO | District Health Office |

# GLOSSARY OF TERMS

**Complementary feeding:** Feeds and fluids fed to breastfeeding children in addition to breast milk.

**Exclusive breastfeeding:** Giving only breast milk and no other liquids or solids, not even water, with the exception of drops or syrups consisting of vitamins, mineral supplements or medicines, to the baby for the first 6 months of life

**Mixed feeding:** Breastfeeding a baby but also feeding the baby other feeds other than breast milk.

**Optimum breastfeeding:** Initiating breastfeeding within 1 hour of delivery and exclusively breastfeeding for 6 months; and continued breastfeeding for to 2 years

**Perception:** An opinion a person has. Does not necessarily mean awareness

**Predominant breastfeeding:** Breastfeeding a baby without giving any feeds other than water based fluids

**Pre-lacteal feeding:** Giving an infant feeds or fluids before initiating breastfeeding after birth.

**Replacement feeding:** Complete avoidance of breastfeeding and feeding the baby other feeds other than breast milk from the time of birth.

**Wet-nursing:** Having another woman breastfeed a baby

# Chapter 1

## 1.1 Country Profile

### 1.1.1 Geography

Malawi is a landlocked small country situated south of the equator in sub-Saharan Africa. It lies between latitudes $9^0$S and $17^0$S and longitudes $33^0$E and $38^0$E. It is bordered by Republic of Tanzania on the north and northeast. On the east, south, southwest it is bordered by Republic of Mozambique. On the west and North West it is boarded by Republic of Zambia (1;1).

The country is 901 km long and ranges in width from 80km to 161 km. It has a total area of 118,484 square kilometres of which 94, 276 square kilometres is land area. The remaining is Lake Malawi, which is about 475km long and runs down Malawi's eastern boundary with Mozambique.

Malawi has a tropical savannah climate with varying temperatures and rainfalls depending on altitude and proximity to Lake Malawi. The Lake shore has hot and humid weather all year round, with mean annual temperature of 24 $^oC$ . The temperatures generally decrease with increasing altitude towards the in-land. Rainfall increases with altitude. The least rainfall is along the Lake shore, while the inland has higher rainfall. Regardless of the altitude differences, Malawi's climate varies in three main seasons: A dry cool season from May to July; a dry hot season from August to November; a warm rainy season from November to April.

**Fig 1:** Map of Malawi

### 1.1.2 Administration

The country is divided into three main regions for administrative purposes: the Northern, Central and Southern regions. The regions are further divided into districts. The northern region has 6 districts; the central has 9 districts, while the southern region has 12 districts. The districts are divided into Traditional Authorities presided over by chiefs. A Traditional Authority is composed of villages, smallest administrative units, presided over by village headmen. For representation in parliament by a member of parliament, villages are grouped into constituencies(1). For development related work, constituencies are subdivided into wards. Each ward is represented by a ward councillor. Lungwena and Mangochi Township, our study areas, are constituencies. Both of these two areas have the Traditional Authority area demarcations and the wards. However, Mangochi Township being an urban area uses mostly wards for area demarcations. While Lungwena being a rural area, uses the traditional authority hierarchy where villages are used for location of places.

### 1.1.3 Population and demographic characteristics

Malawi has experienced population growth over the years. The latest population census in 1998 showed a total population census of about 10 million people. This figure represented a 24% population increase over a 10 year period. Malawi has one of the highest population densities in Africa, with 105 persons per square km. However, the population density varies considerably in the different regions. The southern region the region in which the study area is located has a population density of 114 per square km(2;3).

Malawi's population is largely constituted by young people. According to the 1998 population census, the median age in Malawi was 18 years. Children under five years constitute 17% of the total population; whilst as infants less than 12 months old constitute 4%. Children under five years and infants under one year old constitute similar proportions of the population both in rural and urban areas(3).

### 1.1.4 Economy

Malawi is classified as a low-income country. The country has inequitable income distribution with over 60 % of the people living below the absolute poverty line(4). Malawi's economy is largely agro-based, with tobacco, tea, sugar as the main export crops. Other sources of Malawi's income include: manufacturing, industry and other services. Malawi has a Gross National Product (GNP) per capita of US$ 170(5).

## 1.2 Overview of health issues in Malawi

### 1.2.1 Health indicators and disease burden

Malawi's under five and infant mortality rates as well as maternal mortality have remained high in the 1990s. The 2000 Malawi Demographic and Health Survey (MHDS) reported infant and under five mortality rates of 104 and 189 per 1000 live births. Maternal mortality rate was reported to be 1,120 deaths per 100 000 live

births(1). The average pattern of under-five and infant mortality shows that 22% of these deaths occur during the neonatal period, while 33% occur during the postnatal period and over 45% of all deaths occur at 1-4years(4).

Life expectancy has been on the decrease with the HIV/AIDS epidemic. In 1995 it was established to be 48years. This was an increase from 37, which was the registered life expectancy in the 1950s(2). Presently the life expectancy estimate is at 40 years. Total fertility rate is at 6 children per woman.

Malawi has had a growing HIV/AIDS burden from a prevalence of 1.7% in 1987 to 19.8% in 2003, as by sentinel surveillance data. Infant and child mortality linked to AIDS has also been on the increase. AIDS cases in children 0 – 4 years, who are believed to have acquired the infection from their mothers, is significantly higher than in older children 5 – 15 years(6;7). MTCT is by far the largest source of HIV infection in children below the age of 15years.

### 1.2.2 Health care services

Malawi's formal health care services are provided by largely three main agencies. These agencies include the Ministry of Health and Population (MoHP) providing about 60%, Christian Health Association of Malawi (CHAM) provides 37% while the remaining 3% is provided by Ministry of Local Government, private practitioners, Army and Police(4). CHAM, which is the major government collaborator in health comprises of independent church-related and private voluntary agencies. Government subsidizes CHAM's costs for health delivery through annual grants for human resource expenses. CHAM health services require user fees for services with few exceptions for growth monitoring, immunizations; community based preventive services that include treatment for specific communicable diseases such as TB and STIs.

Health services are provided at three levels: primary, secondary and tertiary. At primary level, services are delivered through health centres, health posts and outreach clinics. The primary level is largely the first point of contact for health care services at community level. Secondary health care services mainly functions as a backup to the primary health care services by providing surgical services among others. District hospitals and most of CHAM hospitals provide this level of health care. Nearly each district has a district hospital owned by the government. The tertiary level services are similar to those at secondary level except for specialist surgical and medical interventions. Despite this organization in the health care delivery, health facilities are still inaccessible to many people. In 2000, there were about a total of 510 primary health care facilities, each serving an average of 16 000 people (4).

## 1.3 Overview of nutrition issues in Malawi

### 1.3.1Food security

Although Malawi used to be food secure in the 1980s, the long term impact of unfavourable agricultural policies, lack of political will, and natural disasters have resulted in recurring years of food shortage since 2000. Agricultural policies adopted

since independence favoured commercial farmers. As such small scale farming which meets the food needs for the majority of the population has had little growth, insufficient to keep pace with the growing population. Small holder farmers with farming land between half to one hectare can only meet 40 – 70% of their staple food requirement(2).
Particularly vulnerable to food insecurity are female headed households. Female headed households have fewer adults and therefore less labour power, an important factor during labour intensive periods of the farming calendar. In addition women are handicapped by a higher rate of illiteracy, less skills training and traditions which discourage women from small scale trading initiatives. As such women's economic access to food is limited(8).

### 1.3.2 Malnutrition

Childhood malnutrition is a major health problem in Malawi. The most recent Demographic and Health Survey (DHS) conducted in 2000 reported that 49% of all children under five years were stunted; The prevalence of being underweight was 25%; while wasting was at 6%. The estimated prevalence are not different from the 1992 Demographic and Health Survey results, implying no improvement in the long-term nutritional situation of children over the last eight years(1).
The incidence of malnutrition varies with seasons. In months before the harvest: January, February, the incidence of malnutrition is higher than in the months of the post harvest season(1).

### 1.3.3 Breastfeeding

In Malawi breastfeeding is universal. Breastfeeding prevalence (among children under two years) is over 90%. Initiation of breastfeeding within the first hour of delivery is also high, although not universal, 72%. Exclusive breastfeeding has been on the increase in Malawi, from 3 % to 63%; according to the 1992 and 2000 Malawi DHS.

### 1.3.4 Nutrition Programs

Nutrition programs are co-ordinated by a government agency independent of the Ministry of Health. The major national nutrition national concern has been under nutrition in children under five years. To combat this problem, partnership programs between NGOs and government have been implemented. The focus of such programs has been on supplementary feeding, either community or health facility based; and diet diversification through improved agricultural activity(9). One of the most recent notable national programs for prevention of malnutrition was the Targeted Nutrition Program which was facilitated by UNICEF and the government at national level. Through this program moderately malnourished lactating mothers and underfives were provided with food rations at all levels of healthcare.

***The Baby Friendly Hospital Initiative***

Promotion of breastfeeding has also been widely used as a strategy in combating under nutrition. The Baby Friendly Hospital Initiative (BFHI) is the major project through which breastfeeding has been promoted. To a smaller extent breastfeeding has also been incorporated in other programs like Saving New-born Lives.
The BFHI a worldwide UNICEF and WHO program aimed at making maternity units whether free standing or in a hospital to be centres of breastfeeding support was launched in Malawi in 1992(10).

A hospital is designated to be baby friendly if it does not accept breast milk substitutes, feeding bottles or teats and has implemented 10 specific steps to support successful breastfeeding. In summary the ten steps are: having a breastfeeding policy; training health care staff in skills necessary to implement the policy; inform all pregnant women about the benefits and management of breastfeeding; help mothers initiate breastfeeding within 30min-1 hour of delivery; show mothers how to breastfeed and maintain breastfeeding even when they are separated from their infants; give no pre-lacteal feeds to infants; allow mothers to remain together with their babies for 24hours; encourage breastfeeding on demand; give no artificial teats or pacifiers to breastfeeding infants; foster establishment of breastfeeding of breastfeeding groups and lead mothers to them after discharge. By 2002 there were 7 baby friendly hospitals in Malawi(10).

## 1.4 Urban and rural areas settings

The population of Malawi is largely rural. About 86% of the population lives in the rural area. Population census data from 1977, 1987, 1998 decades indicates that urbanization has been steadily increasing from 9% to 11% and to 14%, in the respective years. The main livelyhood occupation for the rural population is small-scale farming. Small scale farmers use 47% of the land, while large scale farming occupies 9% of the land. Nevertheless, 55% of the small holder farmers have less than one hectare of cultivatable land, while 25% of the small holder farmers cultivate less than half of a hectare(2). In addition to farming, trading and non-agriculture employment are also prevalent in rural areas. They are mainly characteristic for those who are well off. Livelihood occupations in the urban areas include regular employment and trading. However, trading in the urban areas is more characteristic for the poor. A common form of trading in urban areas is street vending(11).

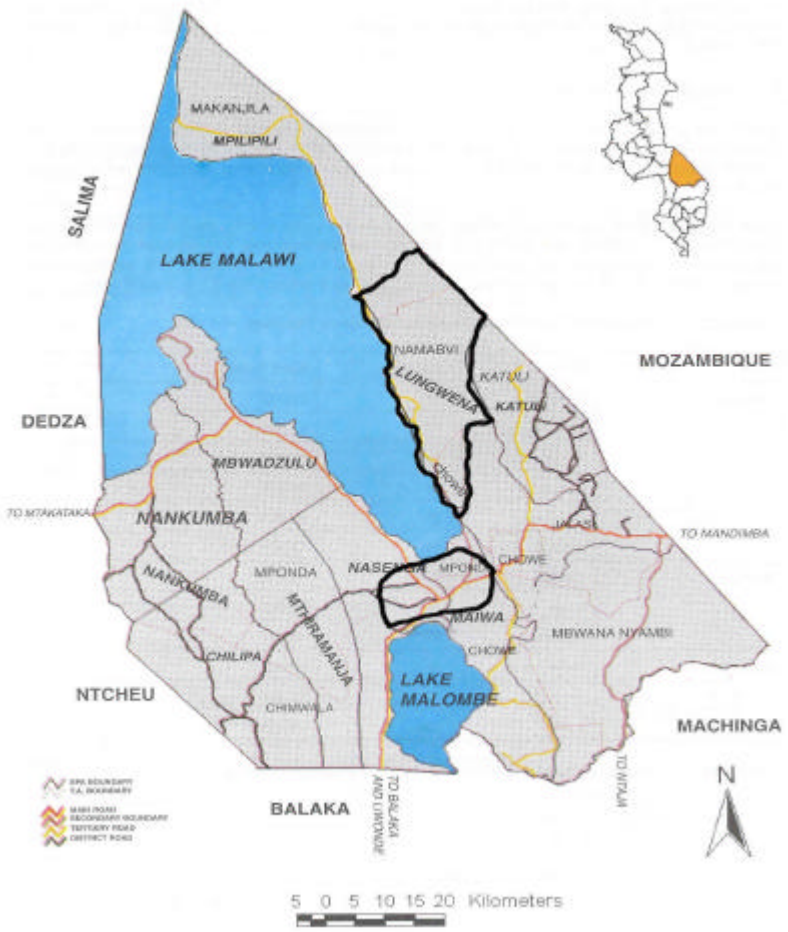
There is a difference in the quality of healthcare available between rural and urban area settings(11). Primary healthcare is the easily accessible form of healthcare in rural areas. While in urban areas, secondary and tertiary health care services are easily accessible.

## 1.5 The study area (Mangochi district)

Mangochi district is situated on the shores of Lake Malawi. It has a population of 599, 935. Infant mortality and fertility rates are higher compared to the national average rates. Infant mortality is at 169/1000; national average rate is 134/1000. Fertility is at 7.6, while the national average is 6.8(3).

The district has one secondary health delivery level hospital and 29 primary health care facilities. The hospital is situated in the centre of the district, and which is also the town part of the district, where our urban study community was located. The health centres are situated in the rural areas, which are in the outskirts of the district.

**Fig 2:** Map of the Mangochi district




The areas circled in black are the study communities. The rural community is the one bordering Lake Malawi, inscribed with the area name Lungwena inside. The urban community is the circle, sandwiched between Lake Malawi and Lake Malombe.

Mangochi hospital works in partnership with Save the Children US in community health programs. Their first partnership program, Community Health Partnership, was in 2000. Through this program information, education, and communication (IEC) materials on exclusive breastfeeding were disseminated; all the cadres of human resource: clinicians and support staff like security guards were given training on breastfeeding. A committee was also established at the hospital to be looking into issues of breastfeeding. Through this committee the hospital coordinates a community based group for promotion of exclusive breastfeeding. The group conducts dramas, gives talks to fellow women on exclusive breastfeeding and other health issues. Saving Newborn Lives and Integrated Management of Childhood Illnesses are other programs which are also being run in partnership.

One of the 29 health centres of Mangochi district is Lungwena health centre. This health centre serves the area from which our rural study community was selected. At Lungwena healthcentre there have been research projects (both clinical and community-based) which have been going on since mid 90s. Compared to other

healthcentres in Mangochi district, Lungwena keeps well organised records of the people in its catchment area.

Other than the hospital, infrastructure in the town of the district, Mangochi Township, include: district administration offices, post office, banks, museum, town hall, and a few restraunts. The rural areas have no electricity, and none of the infrastructures found in the town. Tarmac roads running from the central town area to the eastern, north east, and southern boarders of the district were constructed lately in the year 2003. Other than these three main roads, the rest of the rural outskirts can only be accessed by dirty roads, with limited access during rainy season.

The main form of livelihood in Mangochi Township includes employment in the various institutions in the town and small scale trading. In the rural areas the main form of livelihood is subsistence farming and small scale fishing.

# Chapter 2 Literature review

## 2.1 Infant Nutrition

Malnutrition is defined as a condition that results from excess, imbalance, or deficit of nutrients. It is also defined as some measure of ill health due to inadequate nutrition that can be prevented or cured by improved nutrition. Malnutrition is associated with both under nutrition and over nutrition. In the context of this study, malnutrition is synonymous to under nutrition. By definition under nutrition is lack of the minimum amount of proteins, carbohydrates, lipids, vitamins, minerals, and other nutrients essential for sound health and growth(12).

Malnutrition has been responsible directly/indirectly for 60% of the 10.9 million deaths annually among children under five. Over 2/3 of these deaths which are often associated with inappropriate feeding practices, occur during the first year of life. Every year as much as 55% of infant deaths from diarrhoeal disease and acute respiratory infections may be the result of inappropriate feeding practices. Malnourished children who survive are more frequently sick and suffer the life long consequences of impaired development. No more than 35% of infants world wide are exclusively breastfed during the first four months of life; complementary feeding frequently begins too early or too late and foods are often naturally inadequate unsafe(13)

## 2.2 Clinical importance of Breast milk

Breast milk is adequate to meet all the nutritional needs of infants from birth up to 6 months. From 6 to 12 months breast milk can still meet about 50% of the infant's nutritional needs(14). Based on this, breastfeeding of infants in the first 6 months of life without giving any fluids or fluids other than for medicinal reasons –exclusive breastfeeding- has been recommended by WHO as the appropriate way of feeding infants(13). Colostrum which is the first milk produced by the mother is nutritious and contains a high concentration of antibodies that protect babies from infection before child's immune system has matured. Hence that is why early initiation of breastfeeding is important as it enables infant to benefit from colostrums(1). Breast milk is also ideal given that infants' gastrointestinal and renal functions are not mature enough before 4-6 months and as such they can not handle some constituents of other none-breast milk foods(15). It is well known that the duration of breast feeding is associated with the delay in maternal fertility post partum. In population where use of contraceptives is low breastfeeding for two years or more is thus related to a longer birth interval, which has a positive impact on child health(16)

### 2.2.1 Exclusive breastfeeding

Evidence exists that exclusive breastfeeding in early life protects against infections and reduces mortality, particularly in developing countries where microbial contamination of foods and fluids is common. In a study done in Peru, exclusive breastfed infants were less likely than other infants to experience diarrhoea and respiratory illness in the first six months. The relative risks were particularly high for those given solid foods, but even when the only items given were non-milk fluids

(waters, teas and other infusions); the prevalence of diarrhoea was doubled(17). Not only does diarrhoea occur less frequently in exclusively breastfed infants, but when it does occur, it is less likely to have a negative impact on their nutritional status. In another study, infants did not decrease their consumption of breast milk during diarrhoea illnesses and fever, where as their intake of energy from non-breast milk foods and fluids decreased by 20-30%(18). These protective effects are the most likely explanation for the generally better growth performance during the first few months of life of infants in poor populations who receive little or nothing other than breast milk, compared to their performance after weaning foods are introduced(19). Although the protective effect of breast feeding against infections diminishes with age and early introduction of other foods there is evidence that morbidity and mortality rates remain lower in children who continue to be breastfed up to 2-3years of age(19). This can be explained by the fact that many of the antimicrobial constituents of human milk such as secretory IgA, are still, present in considerable amounts in the second year of lactation and are thought to retain a portion of their ant-infective properties(20;21) However this has been found to be the case in many though not all developing countries.

Exclusive breastfeeding minimizes the risk of asthma and this protective effect seems to persist for at least during the first decade of life which is particularly evident in children from families with a history of atopic diseases. Exclusive breastfeeding also seems to protect against the development of type 1 diabetes mellitus. It has been described that exposure of infant to cow's milk before the fourth month can be an important factor for this disease and that it can increase the risk for diabetes by 50% (16).

Breast milk protects against a host of environmental insults to which the growing infant has not been previously exposed, thus allowing the immune system to develop naturally without undue premature stress.
Numerous studies have demonstrated that the hydration status of exclusively breastfed infants is normal even in hot climates. Thus there is no need to provide extra fluids to breast/fed infants to satisfy their fluid requirements(22). Use of non-breast milk foods and fluids may interfere with bioavailability of certain key nutrients in breast milk, such as iron and zinc (16). Although concentrations of these nutrients in human milk are relatively low, when the infant is exclusively breastfed, the proportion absorbed is high.

### 2.2.2 Breast milk production

Infant demand is the primary determinant of maternal milk production, therefore avoidance of other foods and fluids is essential to optimize breast milk intake(15;16). This suggests that human lactation is quite plastic and that in most cases milk intake by a single infant is far below potential milk production. In addition, malnourished women can sustain adequate milk production for as long as would be desirable for the infant to be exclusively breastfed. For example, Brown et al 1986 reported that poor Bangladesh women produced an average of 750ml/day of breast milk when their infants were five to seven months of age, even though the women could be considered poorly nourished(23).

### 2.3 Complementary feeding

The period of complementary feeding defined to be the time when any nutrient containing foods or liquids are offered to children in addition to breast milk, is a critical and vulnerable time in the growth and development of children(15).

Infants have to be fed adequate complementary foods at the right time so that they can grow without faltering. An adequate diet has to be rich in energy, proteins and micronutrients (especially iron, zinc, calcium, Vitamin A, Vitamin C and folates); in adequate amounts, easily available and accessible. It is of paramount importance that infant be fond of the diet and that this diet be culturally acceptable(14).

In most developing countries adequate nutrient intake of several nutrients is difficult to achieve from traditional, unfortified complementary foods that are commonly consumed. For instance, C Hotz found that in Malawi, infants were receiving maize gruels of 7% and 10% dry matter. Before 6 months, the lighter gruel, with 7% dry matter, was more commonly given to the infants; while the other gruel was given in later infancy. The lighter gruel had an energy density of 109kJ/100g, which is less than half of the energy density of breast milk(24).

Complimentary foods and fluid given prematurely may lead to an earlier cessation of breast feeding(25). In a study from Southern Brazil, it was observed that use of such foods was associated with earlier termination of breastfeeding, even when controlling for nursing frequency. Most of the items given to young infants are less nutritious than breast milk, and therefore if displacement occurs the infant may be at a nutritional disadvantage, even if the items are prepared hygienically(15). It has been suggested that even non-caloric fluids affect breast milk intake. Sachdev et al reported that milk intake (total fluid intake) was lower among breastfed infants in India who received water supplements (n=22) compared to those assigned to an experimental group who received no additional fluids during the 8 hour daytime test period (n=23) (14).

## 2.4 Breastfeeding practices

Definitions of optimum breastfeeding practices have commonly included three main elements: Initiation of breastfeeding within at least one hour of delivery; exclusive breastfeeding for 6 months; and continued breastfeeding up to two years. However other appropriate breastfeeding practices not commonly included in this definition include on frequent breastfeeding which is on demand, giving the child colostrum, and avoidance of pre-lacteal feeding. Studies which have looked at breastfeeding practices have mostly been based on these parameters.

The median duration of breastfeeding in 25 African countries that have national data is estimated to be 21 months. However although prolonged breastfeeding is universal, exclusive breastfeeding is rarely practised(26). WHO estimated the rate of exclusive breastfeeding to be below 20% in most African countries.

Various factors have been found to be associated with breastfeeding practices. These factors have been rural-urban differences, cultural, perception-related, socioeconomic,

demographic, and biosocial. The above factors affect breastfeeding and exclusive breastfeeding rates in different directions and to varying degrees (27;28).

### 2.4.1 Rural-urban differences

Basing on countries' data for demographic and health surveys, Haggerty, has reported that infants living in rural areas are fed 3 months longer than their urban counterparts. Although breastfeeding is longer in rural than urban areas, exclusive breastfeeding is rare in both areas. This was similarly found in a study in Sudan which was comparing breastfeeding practices and attitudes in an urban and a rural community. In the same study breastfeeding on demand was higher in the urban than the rural area. Reduction or stopping of breastfeeding was more prominent among urban high class than the rest of the mothers in the Sudanese study. Impact of traditions and beliefs on breastfeeding duration was more pronounced in the rural than the urban area(29). In relation to this finding, discarding of colostrum was found as a common practice among rural mothers than urban mothers in a study in Tanzania(30).

### 2.4.2 Cultural factors

Similarly other studies carried out in rural settings have found cultural beliefs to be influential on breastfeeding practices (29;31;32). In a study in one of the rural districts in Tanzania it was found that in many cases mothers could only breastfeed the infant with milk from one breast milk, based on the belief that the milk from the other breast is bad. A study in five rural communities of Nigeria, found that half of the mothers discarded colostrums based on the belief that it is bad for the baby(33).

### 2.4.3 Perceptions

Studies in both affluent and resource constrained societies have found associations between perception-related factors and breastfeeding. In a longitudinal study of pregnant mothers from 6 weeks pre-natal to 6 months post partum in United States mothers' breastfeeding knowledge was found to be associated to breastfeeding duration(34). In a different study in the United States, breastfeeding mothers compared to none-breastfeeding mothers reported that their families had more knowledge on breastfeeding. This was a cross sectional where subjects were identified through hospital records(35). Similarly in studies in Australia and United States (a different place from the earlier alluded to); breastfeeding was found to be associated with maternal perception of breastfeeding support from their partners and infants' grandmothers(36;37). In another study in the United States where data on maternal perceptions were collected using validated instruments (Maternal Health Beliefs Questionnaire and Parenting Daily Hassles) breastfeeding mothers had a lower perception of hassle from their infant's behaviour; higher perception of severity of illness and higher confidence in the ability of health care to prevent illness. This was a case-control study among African-American mothers(38).

In a cross sectional study in Ghana maternal positive attitude (measured based on agreement with the WHO recommendations for exclusive breastfeeding) on exclusive breastfeeding was associated with exclusive breastfeeding(27). In other cross sectional studies in Sudan and Nigeria, maternal perception of an old enough baby who can begin to take other feeds was found to be associated with cessation of breastfeeding (29;39). The common reason for introduction of complementary feeds found in studies in Tanzania, South Africa, and Kenya has been maternal perception that her breast milk production is insufficient to satisfy an infant's hunger (30;39;40).

Nevertheless studies in similar settings also indicate that mothers perceive breast milk as the best infant food (29;30;33;39;41). However complementary foods are perceived as a benefit to mothers under time constraints(39).

In addition to the findings of different studies explained above, the link between perception and behaviour has theoretical explanations. A widely used theory is the Health Belief Model. Its premise is that an individual will engage in behaviours to prevent, control, or treat a health problem if they believe that they are susceptible to it; if they believe the problem to be severe; if they believe an action they may take will benefit them or achieve a desirable outcome related to their health. This theory assumes that a mother who perceives breastfeeding to be beneficial to her baby's health and her own is more likely to prolong breastfeeding or exclusively breastfeed(38).

### 2.4.4 Demographic factors

The demographic factors which have been found to be associated with exclusive breastfeeding have been level of education, parity. In a cross sectional hospital based study in Nigeria, having secondary or tertiary education was associated with shorter duration of breastfeeding; with a higher level of association for tertiary education than for secondary education (42). However in a longitudinal study in rural Malawi, literacy was found to be an independent predictor of exclusive breastfeeding(43).

### 2.4.5 Biosocial factors

Breastfeeding support in community and clinical settings has been associated with longer exclusive breastfeeding periods and breastfeeding duration. In a case controlled study in Bangladesh where mothers were offered breastfeeding advice through home visits by peer counsellors, exclusive breastfeeding was more than ten fold higher in the intervention group compared to the control group. In addition mothers in the intervention group initiated breastfeeding early and were less likely to give pre-lacteal feeds(44). Similar differences in exclusive breastfeeding rates were found in an intervention group of a case control study in Chile. The intervention was a hospital-based breastfeeding promotion program. Among other things the intervention provided a lactation clinic which was focusing on prevention and management of breastfeeding problems and infant follow-up with special emphasis on maintaining exclusive breastfeeding for 6 months. Another hospital based lactation counselling intervention in Ghana (with counselling at least during pre-, and post-natal) registered a two fold increase in exclusive breastfeeding rates(45). Delivery in a health facility (as opposed to delivery at home) was found to independently predict exclusive breastfeeding in rural Malawi(43). In another study in Nigeria, delivery at a tertiary or secondary health facility (as opposed to primary health facility) was found to predict exclusive breastfeeding(46).

### 2.4.6 Socio-economic status

Association of socio-economic status to breastfeeding has been found to be in opposing directions in different studies. Studies conducted in two different cross sectional studies; in Ghana and Nigeria, in seemingly urban settings found that higher socio-economic status independently predicted exclusive breastfeeding(27;46). However, in a study in urban Guatemala which was also cross sectional, mothers who were not working outside homes were much more likely to exclusively breastfeed than those working outside homes(47). Similarly lower socio-economic status was

found to be positively associated with exclusive breastfeeding among low-income mothers in three Latin American countries(48). In a rural east African study, mothers were reducing daily frequency of breastfeeding to accommodate other activities such as collecting water and fuel wood, tending cattle and constructing housing(39)

## 2.5 Breastfeeding in the context of HIV/AIDS

Breastfeeding in mothers who are HIV positive gives 10-20% risk of Mother-to-Child-Transmission of the AIDS causing virus. Current infant feeding recommendations by WHO for mothers who are HIV positive indicate include replacement feeding where it is feasible, safe, and acceptable; of which if these conditions are not met, which is difficult to achieve in developing countries settings; then exclusive breastfeeding is recommended. However, as literature indicates the norm for infant feeding in most communities is mixed feeding and not exclusive breastfeeding. However a number of studies have found out that mixed-fed infants are at a greater risk of acquiring HIV than those breastfed exclusively(49). Infants up to 3 months of age given both breast milk and other foods have 24.1% risk, while those exclusively breastfed have 14.6% risk and non-breastfed infants have 18.8% risk. In the context of HIV/AIDS then, being just breastfed or exclusively breastfed can mean either life or death for an infant.

# Chapter three: Problem statement, Rationale and Study Objectives

## 3.1 Problem statement

Childhood malnutrition, an important risk factor for child mortality, has been a major health problem with no improvement over the last eight years in Malawi. One of the direct causes to child malnutrition is inadequate dietary intake, more often a result of inappropriate feeding practices. On the other hand breast milk has unique nutritional characteristics and hence optimum breastfeeding practices can avert the risk of malnutrition. Of late the HIV/AIDS epidemic has come on the scene. In Malawi in a period of less than a decade, the epidemic has increased from less than 1% to more than 15%. In the context of HIV/AIDS, being just breastfed has different implications from being exclusively breastfed. Exclusive breastfeeding is the only feasible, safe, and acceptable method of infant feeding for mothers who are HIV positive in resource poor settings like Malawi. It is against this background that we planned a study on infant feeding practices and perceptions, with more focus on breastfeeding practices.

## 3.2 Rationale

In Malawi studies done to look at infant nutrition, have focused on infant feeding practices, without much focus on maternal perceptions on infant feeding issues. But literature indicates that maternal perceptions, in addition to socio-economic and demographic factors, can influence the way infants are fed. However, in making interventions for improvement of breastfeeding practices, demographic factors being 'static' factors can be difficult to utilise. On the other hand, perception- related factors are flexible and can provide greater potential as intervention targets.

Literature indicates that there are differences in infant feeding practices between urban and rural dwellers. Therefore it is important to take into account differences in area of residence when studying infant feeding practices. Like other developing countries, the rate of urbanization in Malawi has been on the increase, from 3% to 11%. This implies that in the time to come more communities will be urban than there are now. Therefore knowledge of what infant feeding practices are in urban settings would give a projected view of what infant feeding would be when most of the communities become urbanized.

## 3.3 Objectives of the study

### 3.3.1 Main objective

To study breast feeding practices and perceptions in an urban and a rural setting and investigate which socio-demographic factors are associated with optimum breastfeeding practices and child's nutritional status.

### 3.3.2 Specific objectives

1. To describe and study differences in breastfeeding practices in a rural and an urban community.

*When is breastfeeding initiated after birth in health facilities, or at home?*
*Is colostrums (first milk produced by the) mother given? What is given instead (pre-lacteal feeds)?*
*To what extent and for how long is exclusive breastfeeding practised?*
*When is water introduced and other complimentary foods?*
*What type of complementary feeds do mothers start with?*
*For how long do mothers breastfeed?*
*How do mothers feed the infant when it is sick?*

2. To describe mothers' opinions about breastfeeding, complementary feeding; and study the relationship between their opinions and practices.
*What do mothers perceive as the optimum length of exclusive breastfeeding?*
*When do they think is the appropriate time to introduce complementary foods?*
*Do their perceptions have any bearing on the infant feeding practices they do like length of time for which they exclusively breastfeed and time they initiate other feeds?*
*What foods do they perceive as being appropriate to be given as complementary feeds to the infant and why?*
*What do mothers know about the advantages of breastfeeding?*
*What do people say about mothers who feed infant replacement foods alternative to breastfeeding?*
*What to mothers perceive to be the hindrances to exclusive breastfeeding?*

3. To identify the influential source of information for mothers' practices and perceptions
*Who do mothers consult to decide when to introduce water and complementary foods; and to wean the child?*
*Who is the influential person for mother's perceptions?*
*Who alternatively takes care of the infant when the mother is busy?*

4. To describe breastfeeding practices in instances when the mother or the child is sick.
*How do sick mothers' breastfeed their infants?*

5. To asses mother's awareness about mother-to-child-transmission (MTCT) and their opinion on breastfeeding of HIV+ mothers
*Do mothers know about MTCT; and ways of its prevention?*
*Would mothers opt to breastfeed or not if found they were to be found HIV positive*

6. To determine nutrition status of the children under the study and its relationship to feeding practices

# Chapter 4: Materials and Methods

## 4.1 Study areas

The study was conducted in Mangochi district. The district was chosen because the findings of the study will form part of a rural livelihood project started in Mangochi district in June 2004. Two communities within Mangochi district were purposively chosen. The communities were Mangochi Township, which is the main urban part of the district; and Lungwena, 30 km east of Mangochi Township, a rural area, where the rural livelihood project is taking place.

## 4.2 Study design and population

### 4.2.1 Study design

The study mainly used quantitative methodology and was cross-sectional in nature. However, some data was collected qualitatively through the following:

- Observations as the interviews were being conducted in the respondent's homes.
- Additional information which respondents gave in response to the structured interview questions, which was recorded as field notes.
- Informal interviews with the following key people: Maternal and child health co-ordinator at Mangochi district hospital and community health nurse at Lungwena health centre and two elderly women, one from the rural and the other form the urban.

The qualitative data was used to validate quantitative data.

### 4.2.2 Study population

The study population was infant-mother pairs of women who are mothers of infants below 12 months old. This age range was chosen to enable us focus on both breastfeeding practices, and early complementary feeding practices.

***Inclusion criteria***

Ideally any mother of an infant below 12 months could have been eligible for the study. Nevertheless, study participants were enrolled on the following basis:

- Being resident in the study area for not less than less than 6 months prior to the study;
- Living in the study area at the time of the study.

This was to ensure that findings of the study would be representative of the residents of the study area, and could be utilized for long term intervention planning.

***Exclusion criteria***

The following were excluded from the study:

- Mothers of twins, triplets or such like were excluded from the study. This is because twins have different feeding patterns from singletons.
- In instances where there were two infants in a household, one was excluded from the study.

## 4.3 Sample size

The sample size was determined using a formula (indicated below); to enable estimation of a sample size which would be large enough for comparisons between two groups, in our case rural and urban. In the formula, prevalence of malnutrition, assessed as having less than -2SD weight-for-age in children under five years of age in Malawi was used(1).

$$N = \frac{(u + v)^2 \{p_1 (100 - p_1) + p_2 (100 - p_2)\}}{(p_1 - p_2)}$$

u = one sided percentage point of the normal distribution, corresponding to 100%

v = percentage point of the normal distribution, corresponding to the two sided significant level

p = proportions: According to MHDS 2000, % of under five children with -2SD weight for age in urban residents is 12.8% while in rural residents is 27.3%.

$$N = \frac{(1.28 + 1.96)^2 \{(12.8 \times 87.2) + (27.3 \times 72.7)\}}{14.5^2}$$

$$N = \frac{(10.4976) \times \{(1116.16) + (1984.71)\}}{210.25}$$

$$= 155$$

Contingency of 25% was included: A high contingency % was used to make up for differences in samples sizes when other formulas were used.

$$= 155 \times \frac{25}{100}$$

$$= 155 + 38.75$$

$$= 195$$

However, due to logistical constraints, only 157 mothers in the rural and 192 in the urban were interviewed. A total of 349 mothers were interviewed for the study.

### 4.3.1 Sampling method

One stage cluster sampling was used to select the research subjects to limit logistical constraints. Town assembly wards were used as clusters in selection of research subjects in Mangochi Township. The town wards are administrative area demarcations for easy governance. Mangochi Township has ten wards. Random numbers were allocated to the wards. Wards were selected in ascending order of the random numbers assigned to them until the required number of respondents was obtained. 3 wards were selected in total.

In the rural community, Lungwena, villages are used in day to day locating of places. Lungwena has 26 villages. To select villages for the study random numbers were assigned to all the villages; in ascending order of the random numbers villages were selected until the required number of respondents was met. A total of 5 villages were selected. All mothers meeting the inclusion criteria in the selected clusters were interviewed.

## 4.4 Ethical Clearance

Ethical clearance for this study was obtained from Norwegian Ethical Committee and Malawi College of Medicine Research Ethics Committee. Permission was also sought from concerned community leaders. Informed consent was obtained from each of the participants prior to their involvement.

## 4.5 Data collection

### 4.5.1 Preparation for data collection

The first step in the field, following ethical clearances, was to obtain inform the Mangochi District Health Office (DHO) about the study. The Mangochi DHO introduced the researcher to Health Surveillance Assistants (HSA), community health workers employed by the Malawi Ministry of Health, responsible for the study areas. The HSAs were not involved in the interviewing of the mothers; however, they were every now and again consulted as community gatekeepers.

#### 4.5.1.1 *Research Assistant*

A research assistant was hired through the Centre for Reproductive Health, a Malawi college of medicine project, introduced to the researcher through the local supervisor. However, all data collected by the research assistant in the absence of the researcher was discarded. This was due to the fact that the researcher identified faked responses for some of the questions, upon verification with the respondents. Therefore to alleviate any possible chances of incorrect information, the researcher excluded all

questionnaires administered by the research assistant in the absence of the researcher, in spite of the consistency of responses in such questionnaires being good and the type of data collected being appropriate. In all, 178 cases from 5 villages in Lungwena area were discarded. New respondents, meeting the inclusion criteria were identified in accordance with the sampling procedure to replace the discarded cases. Interviews for the new cases were conducted by the researcher herself.

### 4.5.2 Pre-testing

The data collection tool was pre-tested among 40 mothers with children less than 12 months of age in one of the wards not included in the study area. Based on the responses during the pre-testing, changes on the questionnaire on the following questions were made:

Pre set answers for questions: 54, 74, 80, 85 were changed to include the most frequently occurring responses. These questions were on: mothers' reasons for weaning time intentions; reasons for preference of a complementary feed, benefits of breastfeeding, and reasons for choosing to breastfeed if mother is found to be HIV positive.

A question on the first time the mother started giving drinking water to the child (Q45) was added to the questionnaire.

### 4.5.3 Logistical matters in the field

The process of data collection started in the Mangochi urban. While doing data collection in this area, all the paper work was done at the Malawi college of medicine project- centre for reproductive health- office. In starting data collection in a selected ward, a meeting was sought with either a councilor or group chief in-charge of the selected ward. Ministry of health- community workers were available in such meetings to give evidence to the councilor or chief that the researcher had indeed obtained the required permission from the district health office. Days for conducting interviews in that specific area were agreed upon in such meetings, to make sure that interviews should not be scheduled in days when there are important communal celebrations. The councilor / chief would also show the researcher a map of that particular selected ward in such meeting. The chief /councilor would then inform residents in that area, a day or two before scheduled days for interviews. On the scheduled days for the interviews, the researcher carrying all necessary equipment including anthropometry tools would visit each household in the area and would conduct interviews and take infant measurement where there is an eligible willing person.

Lungwena health centre provided paper work space for the researcher while collecting data from Lungwena rural area. Village chiefs for the selected villages were informed about the research at a community health management meeting (for Lungwena health centre), where chiefs from Lungwena area were present. Dates for the interviews in various villages were set at that meeting. Like in the urban area the village chiefs informed their residents. Home visits for the interviews were then conducted.

### 4.5.4 Data collection tools

***Structured Questionnaire***

A structured questionnaire was used for data collection. Questions in the questionnaire were adapted from: MHDS questionnaire (ref); baseline survey for the Lungwena rural livelihood project; a study on breastfeeding practices and perceptions, (ref) conducted in Moshi district, Tanzania. The questionnaire was developed in English and translated into two languages: Chichewa and Chiyao, which are the main languages spoken in the study area. Re-translation of the questionnaires from the vernacular languages into English was done and corrections were made.

The questionnaire collected information on the following:
Socio-demographic characteristics: age, sex, marital status, literacy, profession, total children of the mother
Economic status: assets owned, type of house roofing,
Household characteristics: Household size, number of children under five years in a household, child spacing
Living conditions: food security, source of drinking water
Breastfeeding patterns and practices: place of birth; pre-lacteal feeding; time of breastfeeding initiation; feeds the infant was being fed on at the time of interview; first feed to be introduced; initiation of other feeds other than breast milk; time mother intends to wean;
Infant feeding during mother or infants' sickness
Perceptions on breastfeeding: Mother's opinions on time of introducing other feeds to the child other than breast milk and feeds to be first introduced; source of information on breastfeeding; mother's opinion on communities perspective of breastfeeding.
Perceptions on HIV/AIDS: awareness on HIV/AIDS; MTCT; PMTCT and mothers; opinion on whether HIV+ mothers should breastfeed or not.

***Anthropometry measurement tools***

Infants' weights were taken using a digital bathroom scale to the nearest 0.1kg. A bathroom scale was used due to limited resources. Spring scales which could have been a better option were few in number and were being used for other purposes. To obtain an infant's weight, the mother's weight was first taken. Secondly mother's weight while carrying the infant was taken. Infant's weight was obtained by subtracting the mother's weight from mother's weight while carrying the infant. Infants were nude at the times when they were being carried by their mothers. Length was taken using a length board to the nearest 0.1cm. To ensure correct measurement, after taking 5-7 measurements, the weight of a person while carrying a 1kg packet of salt and also without the 1kg of salt was taken.

### 4.5.5 Data handling

Questionnaires were checked on spot at the end of each interview, in case some questions had been omitted. At the end of the day, the questionnaires were re-checked for inconsistencies. In case of such occurring, the researcher went back to the respondent to seek clarity.

## 4.6 Data analysis

Data was entered in MS Access and then later transferred to SPSS for analysis. Anthropometrical measurements were entered in EP INFO to obtain the required deviations (z-scores) from the CDC/WHO 1978 standard reference measurements. Variables were classified as below:

### 4.6.1 Dependent variables

Early initiation of breastfeeding
Exclusive breastfeeding
Infant's nutritional status
Opinionated exclusive breastfeeding
Person of influence in infant nutrition issues (weaning, complementary feeding and perceptions)
MTCT and PMTCT awareness

### 4.6.2. Independent variables

-Area of residence (rural or urban)
-Age
-Literacy
-Father's/mother's profession
-Marital status
-Child spacing between infant in the study and one immediately after
-Assets owned
-Type of house roofing
-Total children of the mother
-Household size
-Number of under-fives in a household
-Food security
-Source of drinking water
-Place of birth

Malnutrition in the sample was assessed using three indicators, weight-for-age, weight-for-height and height-for-age. Weight-for-age, the commonly used indicator in Malawi(1) is an indicator of body mass. It assesses if a child's weight is appropriate given its age. Height-for-age is an indicator of stunting and chronic malnutrition. It assess if a child's weight is appropriate given its height. Weight-for-height is an indicator of wasting and acute malnutrition. It assess if a child's weight is appropriate given its height. However, weight-for-age is also an indirect indicator of stunting and wasting. Limitations of the three indicators have been discussed in chapter 6. In the assessment of malnutrition explained below, the term 'malnutrition' includes both moderate and severe malnutrition.

### 4.6.3 Operational definitions of variables

***Dependent variables***

| | |
|---|---|
| Early initiation of breastfeeding: | Initiating breastfeeding in less than 1 hour after delivery. |
| Exclusive breastfeeding: | First complementary feed; first drinking water and herbal water given to infant after 6 months |

as retrospectively reported by mother. Exclusive breastfeeding rates were also measured at 2 months and 4 months. Infant who had not been given any feed, water or herbal water and were only receiving breast milk were classified as being exclusively breastfed at either 2 or 4 or 6 months depending on their age.

Predominant breastfeeding: Infant at least ever fed drinking water or herbal water in addition to breast milk

Nutritional status: *over-nourished:* >+2 Z-scores for either weight-for-age; or weight-for-height; or height-for-age
*normal:* +2 to -2 Z-scores for either weight-for-age; or weight-for-height; or height-for-age
*moderately malnourished*: <-2 to -3 Z-scores for either weight-for-age; or weight-for-height; or height-for-age
*severely undernourished:* <-3 Z-scores for either weight-for-age; or weight-for-height; or height-for-age

Opinionated exclusive breastfeeding: Appropriate exclusive breastfeeding duration for an infant according to the mother's opinion.

Influential person in complementary feeding: Person who made decision for mother to give first complementary feed to the infant in the study.

Influential person in weaning: Person who made decision for the mother to choose specific time the mother was planning to wean infant in the study.

Influential person for perceptions: Person from whom mother has learnt her opinion on when to introduce complementary feeds to a child.

MTCT awareness: Knowing of at least one method of MTCT.

PMTCT awareness: Knowing of at least one method of PMTCT.

***Important independent variables***

Value of assets owned: Assets owned by a household were weighted as follows:

| Asset owned | Score |
|---|---|
| Car | 4.0 |
| Fridge, or TV or motorcycle or fishing boat (ownership of one or more of these) | 2.0 |
| Mattress, or bicycle or radio (ownership of one or more of these) | 1.0 |
| Blanket | 0.5 |

| | |
|---|---|
| | Categories based on these scores were created as follows:<br>Score — Value label<br>3.00 through highest — well off<br>2.99 – 1.0 — poor<br>1.00 through lowest — very poor<br><br>NB Prior to developing the score, frequencies of assets owned were made. Not many households had more than one asset, hence that's why the scores were based on ownership of one asset. In addition some assets like blankets varied with household size and not necessarily wealth |
| Source of drinking water: | This was classified in two categories:<br>safe: if water was obtained from a piped tap or borehole<br>unsafe: if water was obtained from other sources<br>other sources other than the above mentioned. |
| Milk substitutes: | Cow milk, or goat milk or infant formula |
| Family foods: | Thick maize porridge (staple); and any kind of sauce |

**4.6.4 Statistical methods**

Descriptive statistics of the sample's: socio-economic characteristics; exclusive breastfeeding and opinionated rates; other infant feeding related practices; nutritional status and MTCT awareness were obtained through frequencies and cross tabulations. Continuous normally distributed attributes have been presented as means (± SD). Continuous not normally distributed attributed have been presented as medians ($25^{th}$, $75^{th}$ percentiles).

Differences between rural and urban groups were tested using Chi square statistic for categorical variables. Student's t-test was used to test differences for continuous variables.

Logistic regression was used to test independent associations for the main dependent variables: exclusive breastfeeding (at 4 months used instead of 6 months as % at 6 months was to small) and nutritional status. All dichotomous variables significantly associated with the specified dependent variables at $p<0.05$ were entered in the logistic regression model. Forward stepwise conditional logistic regression method was used. This method self ranks potential predictive variables in order of significance. The variables are then tested in order of significance. One variable is added at a time in the model. The variables in the model adjust for confounding effects of each other at every step an additional variable is added. The term 'predictors' has been used to describe the independent associations.

In all stages of analysis; descriptive, bi-variate, or multivariate significance was measured as $p<0.05$ or less.

# Chapter five: Results

## 5.1 Description of the sample

In the study a total of 349 mothers were interviewed. 157 (45%) were from the rural area, while 192 (55%) were from the urban area. The planned sample size was 384, with equal numbers in both the rural and urban areas. The response rates were: 98% in the rural, and 99% in the urban area.

## 5.2 Demographic and socio-economic characteristics of the sample

### 5.2.1 Demographic characteristics

The median age of all the mothers interviewed was 24 (20-29). The median age of rural mothers was slightly higher (25, 22- 30.5) than that of the urban mothers (23, 20-28), although not significantly different. Of all mothers interviewed the youngest were 16years old, both in the rural and urban area. The oldest mothers interviewed were 44years old in the rural area and 45 years old in the urban area. As for the fathers, median age of the fathers in the rural area was slightly higher than in the urban area (26 versus 31, respectively), but neither this difference was significant. Infants' median age was 5.49 months. There was no significant difference in the proportion of children above or below 6 months between the urban and the rural area (Table 1).

The mean number of people in a household was 5.1 ± 2.1. Households in the rural area were of relatively smaller size (mean 4.7 ± 1.7) than in the urban area (mean 5.5 ± 2.3). This difference was significant (Table 2). The range of number of children under five years old per household was 1 to 4. There was no significant difference in between the urban and rural area in terms of number of children under five years or the distribution of total number of children per mother (Table 2). The range for the number of children mothers in the sample had was 1 to 9. The median number of children per mother was 2.0. These numbers included only children who were alive and living in the mother's household most of the time.

Child spacing between the infant in the study and the one immediately before was long enough (median 3.0, 2.0-3.0). There was no significant difference in the child spacing between the rural and urban area (Table 2).

### 5.2.2 Socio-economical characteristics

The places of birth of the infants varied significantly between the rural and urban areas. A higher proportion of the rural infants were born at home rather than in a health facility (Table 1). Among urban infants, the majority were born within a health

facility (Table 1). Not all the births of infants born outside a health facility were assisted by a traditional birth attendant. (Table 1)

The majority of all the mothers interviewed were married both in the urban and rural areas (Table1). Of those married some were polygamous. In such cases, the husband's time and resources were shared among the co-wives. Slightly more of the rural mothers were in polygamy than in the urban area (Table 1).
Of the married mothers, relatively less women in the rural area (66.9%) than the urban area (80.0%) were living with their husbands most of the time (not less than 3 weeks in a month).

Illiteracy level in the sampled population was outstandingly high (Table 1). The majority of the mothers and fathers in the rural area were illiterate unlike in the urban area (Table 1). However, illiteracy was higher among the mothers than among the fathers in both areas. Among the literate mothers in the rural area, the highest level of education attained was primary school. While among the literate mothers in the urban area, close to half of those who had attended primary school had also attained secondary school education.

The majority of the mothers in the urban area were not involved in any income generating work. However, in the rural area the majority of the mothers, along with the fathers were peasant farmers (Table1). The difference in the mother's professions between the rural and urban areas was highly significant. Only a small proportion of the mothers both in the rural and urban area were involved in relatively higher income (> 400NK in a month) earning occupations like larger trading or permanent employment. Small-scale trading which on average would give an income of less than 150NK in a month was also similarly common among both urban and rural mothers (Table 1). A small proportion of the fathers were involved in high income professions. Slightly more fathers in the urban area than the rural area were high income earners. High income professions were big scale farming (2 fathers in the urban and 1 in the rural area were big-scale farmers); and large-scale business (4 fathers in the rural and 16 in the urban were large-scale businessmen). Most common fathers' professions for the urban area were small-scale trading and permanent employment in the urban area.

**Table 1:** Demographic and socio-economic characteristics of mothers, fathers and infants in the sample

| | rural (N=157) % | urban (N=192) % | p-value |
|---|---|---|---|
| **Mother's characteristics** | | | |
| age | | | 0.198 |
| =20 | 22.3 | 29.7 | |
| 21 - 25 | 33.8 | 34.9 | |
| =26 | 43.9 | 35.4 | |
| literacy | | | 0.000* |
| yes | 28.0 | 63.0 | |
| no | 72.0 | 37.0 | |
| occupation** | | | 0.000* |
| big scale business/permanent employment. | 1.3 | 4.2 | |
| small trader | 21.0 | 22.9 | |
| peasant farmer/worker | 65.0 | 2.1 | |
| unemployed | 12.7 | 70.8 | |
| marital status*** | | | 0.415 |
| never married | 2.5 | 4.7 | |
| married or cohabiting | 87.9 | 91.1 | |
| divorced or separated | 9.6 | 4.2 | |
| **Fathers' characteristics****** | | | 0.400 |
| age | | | |
| =22 | 9.9 | 13.0 | |
| 23 - 28 | 31.3 | 35.4 | |
| ≥29 | 58.8 | 52.6 | |
| literacy | | | 0.000* |
| yes | 42.0 | 82.0 | |
| no | 58.0 | 18.0 | |
| occupation***** | | | 0.000* |
| big scale business/permanent employment | 7.7 | 40.3 | |
| small trader | 29.0 | 42.9 | |
| peasant farmer/ worker | 63.3 | 13.7 | |
| unemployed | 0.0 | 3.1 | |
| **Infants' characteristics** | | | 0.400 |
| age | | | |
| under 6 months | 51.6 | 56.3 | |
| below 6 months | 48.4 | 43.8 | |
| place of birth | | | 0.000* |
| health facility | 48.7 | 84.4 | |
| home with TBA | 28.8 | 9.4 | |
| home without TBA | 22.4 | 6.3 | |

* Significant at p<0.01. ** for chi square test large-scale business/ permanent employment and small-scale trade were collapsed into one category

*** For chi square test never married, and divorced/separated were put in one category. **** For fathers, n = 292

***** For chi square test large-scale farming/business and permanent employment collapsed into one category, and category 'unemployed' excluded

**Table 2**: Households' demographic characteristics

| | Rural N=157 % | Urban N=192 % | p-value |
|---|---|---|---|
| H/hold size | | | 0.008* |
| = 3 people | 32.5 | 21.4 | |
| 4 -5 people | 39.5 | 35.4 | |
| =6 people | 28.0 | 43.2 | |
| Number of under fives | | | 0.102 |
| 1 underfive in h/hold | 59.9 | 49.5 | |
| 2 underfives in h/hold | 36.3 | 43.2 | |
| <3 underfives in h/hold | 3.8 | 7.3 | |
| Total number of children by mother | | | 0.325 |
| 1child | 32.5 | 40.6 | |
| 2 -3 children | 47.8 | 42.2 | |
| 4 - 5 children | 13.4 | 13.5 | |
| 6 or more children | 6.4 | 3.6 | |
| Child spacing (between infant in study and one immediately after) | | | 0.353 |
| 5 - 12 years | 17.8 | 10.6 | |
| 4.99 - 4.0 years | 6.4 | 7.8 | |
| 3.99 - 2.1 years | 25.5 | 20.3 | |
| 2 years or less | 18.5 | 20.0 | |
| single children | 31.8 | 41.0 | |

* Significant at p<0.01

The most common type of housing in both the urban and rural area was grass-roofed houses (Table 3). There were significantly more mothers living in grass-roofed houses in the rural area, than the urban area. Grass can be easily obtained from the wild, unlike iron sheets which have to be bought off the counter. Most of the mothers in the sample were from poor households. That is, they only had a radio and/or a bike and/or a mattress, as the asset with the highest monetary value in addition to blankets. More mothers in the rural area were from poorer households than those in the urban area. In addition, fewer mothers in the rural were from well off households than in the urban area (Table 3). The well off households had a fishing boat and/or TV and/or motorcycle and/or fridge in addition to the items the poor had. The difference between the urban and rural households in terms of socio-economic status was highly significant.

Most of the households had access to safe drinking water, obtained either through a tap or a borehole. The water taps or boreholes were mostly situated in the middle of a village or a residential area to serve as many households as possible. Significantly more households in the urban area had access to safe drinking water than in the rural area. For other household uses other than drinking, a relatively lower proportion (65.3%), of the sample had access to safe water. A relatively smaller proportion of households (50.3%) in the rural area, than in the urban area (77.6%) had access to safe water for household use other than drinking. The unsafe sources of water were unprotected wells, the Lake Malawi, or the River Shire (Fig 2, map). There was a significant difference in the time taken to walk to fetch drinking water between the

rural and urban area. In the urban area water was obtained within shorter time walking distances (median time of walking to the water point = 6 min, 3-10) than in the rural area (median time of walking= 10, 6-15).

Most mothers experienced food shortage for not less than 1 month in a year (Table 3). However, this was significantly more common in the rural area than in the urban area.

**Table 3**: Households' socio-economic characteristics

| | Rural N=157 % | Urban N=192 % | p-value |
|---|---|---|---|
| Food shortage in a year | | | 0.000* |
| no shortage | 31.8 | 54.7 | |
| 1- 2 months | 45.2 | 26.0 | |
| =3 | 23.0 | 19.3 | |
| Drinking water | | | 0.002 |
| safe drinking water | 73.2 | 87.0 | |
| Unsafe drinking water | 26.8 | 13.0 | |
| Type of house | | | 0.000* |
| grass thatch | 96.2 | 65.1 | |
| iron sheets or tiles | 3.8 | 34.9 | |
| Socio economic status by assets owned** | | | 0.000* |
| well off | 7.6 | 19.9 | |
| poor | 55.4 | 67.5 | |
| very poor | 36.9 | 12.6 | |

* Significant at p<0.01

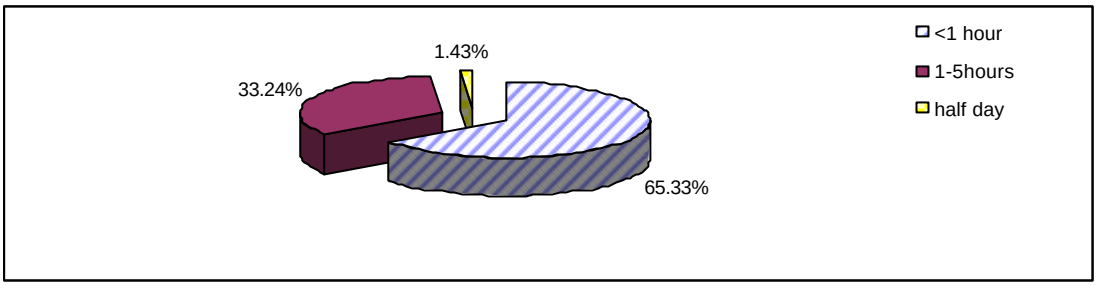
** for the chi sq test: while 'poor' and 'very poor' were collapsed into another category. Socio-economic status was determined by weighting assets each mother's household had. More details in methodology

## 5.3 Infant feeding practices

### 5.3.1 Breastfeeding practices after birth

Breastfeeding practices from birth until the time of weaning were assessed. Upon birth of the child, almost all (98.0%) of the women started breastfeeding without giving any pre-lacteal feeds. The few mothers (n=9) who reported to have given their infants pre-lacteal feeds were all from the rural area. The feeds given were water-sugar solution (0.9%), uncooked water-refined maize flour solution (0.9%) and plain water (0.9%). The reason given for giving pre-lacteal feeds was to 'allow the intestines to expand, so that breast milk can easily pass.'

**Fig 3**: Initiation of breastfeeding among mothers in the sample (n= 349)




Most of the mothers initiated breastfeeding in less than 1 hour after delivery (Fig 3). Slightly more mothers (68.2%) in the rural area than the urban area (63%) initiated breastfeeding within the first hour, but this difference was not significant.

Colostrum was given to the infants by most of mothers (94.8%). A similar small proportion of mothers in the in the rural (5.1%) and the urban (5.2%) reported to have discarded their colostrum.

**Table 4:** Breast milk production during first week of birth and reasons for first complementary feeding event

| | rural | | urban | |
|---|---|---|---|---|
| | n | % | n | % |
| Reduced milk production in first wk of birth | | | | |
| yes | 93 | 59.2 | 110 | 57.3 |
| no | 64 | 40.8 | 82 | 42.7 |
| Feeds given during reduced milk production | | | | |
| plain water | 8 | 8.6 | 2 | 1.8 |
| Glucose water | 1 | 1.1 | 0 | 0.0 |
| Mgaiwa porridge* | 1 | 1.1 | 0 | 0.0 |
| Infant formula | 1 | 1.1 | 4 | 3.6 |
| Cow milk | 3 | 3.2 | 0 | 0.0 |
| wet nursing | 2 | 2.2 | 1 | 0.9 |
| fruit juice | 0 | 0.0 | 1 | 0.9 |
| nothing | 77 | 82.8 | 102 | 92.7 |
| Reasons for first complementary feeding event** | | | | |
| **maternal related** | | | | |
| pregnancy | 1 | 0.9 | 0 | 0.0 |
| Illness of mother | 3 | 2.6 | 1 | 0.8 |
| Inadequate breast milk production | 24 | 20.7 | 18 | 14.8 |
| work situation | 1 | 0.9 | 0 | 0.0 |
| **infant related** | | | | |
| child cried too much | 76 | 65.6 | 83 | 68.0 |
| illness of child | 1 | 0.9 | 5 | 4.1 |
| child showed interest in other feeds | 6 | 5.1 | 5 | 4.1 |
| for the baby to grow quickly | 1 | 0.9 | 0 | 0.0 |
| **social** | | | | |
| health workers advice | 13 | 11.2 | 21 | 17.3 |
| advice from people around | 1 | 0.9 | 0 | 0.0 |
| lack of food | 1 | 0.9 | 1 | 0.8 |

[*] For description of M gaiwa porridge' refer p11. [**] N=238, rural n=116, urban n= 122. Data are multiple responses

About 60% of the mothers reported reduced milk production in the first days after giving birth, but there was no significant difference between urban and rural mothers in this respect . Most mothers who reported reduced milk production after birth did not give their infants any alternative feeds. Of those few who gave alternative feeds, there were more rural than urban mothers (Table 4).

All infants were still being breastfed at the time of the interview. Almost all the mothers (98.9%) were breastfeeding on demand.

### 5.3.2 Herbal water

In the tradition of the area where the study was conducted, infants are given herbal water within the first week upon birth. The herb is locally called *mdima,* but scientifically identified as *asparagus africanus*. This herbal water is given as a preventive treatment against tetanus. The length of time for which the herbal water is given varies; ranging from 3 days to 2-3 weeks. 80.4% of the rural mothers and 31.8% of the urban area reported having given their infants this medication. This difference between the rural and urban area was significant ($p<0.01$).

### 5.3.3 Exclusive breastfeeding and pre-dominant breastfeeding rates

Exclusive breastfeeding rate at 6 months in the whole sample was 3.4%. In the urban area, exclusive breastfeeding rates were significantly much higher than in the rural area (Table 5b). In the whole sample, exclusive breastfeeding rates at 2 months and 4 months were 32.1% and 17.5% respectively. Exclusive breastfeeding rates were lower when calculated among those who are below 4 months (as denominator); and those who were still exclusively breastfeeding at the time of interview as enumerator. The rates at 2 months, 4 months were: 3.13%, 3.23% for the rural and 40%, 26.19% for the urban.

Predominant breastfeeding at 6 months in the whole sample was at 13.2%. This rate was significantly much lower in the rural area than in the urban area (Table 5). In the whole sample, predominant breastfeeding rates at 2 months and 4 months were 81.7% and 43.3%, respectively. There was a larger difference between the urban and the rural areas in exclusive breastfeeding rates than there was in predominant breastfeeding rates (Table 5).

**Table 5:** Exclusive breastfeeding and pre-dominant breastfeeding rates among infants of different ages based on mother's recall at the time of the interview

| | Exclusive breastfeeding (N=349) | | | | | Predominant breastfeeding (N=349) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | rural | | urban | | | rural | | urban | | |
| | n | % | n | % | p-value | n | % | n | % | p-value |
| 2 months | 14 | 8.9 | 98 | 51 | 0.00[*] | 125 | 79.6 | 160 | 83.3 | 0.451 |
| 4months | 5 | 3.2 | 56 | 29.2 | 0.00[*] | 54 | 34.4 | 97 | 50.5 | 0.004[*] |
| 6months | 1 | 0.6 | 11 | 5.7 | 0.02[**] | 11 | 7 | 35 | 18.2 | 0.003[*] |

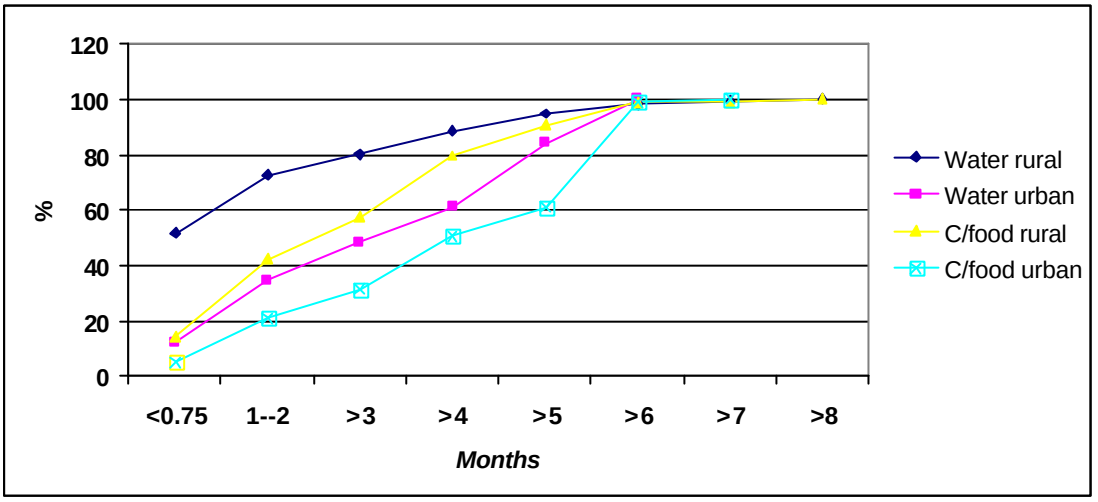
[*]Significant at $p<0.01$. [**]Significant at $p<0.05$

### 5.3.4 Introduction of complementary feeds

Water and feeds were introduced earlier in the rural than in the urban area. In the rural area, by the end of the first 3 weeks of the infant's life, more than half of the mothers had already started giving drinking water to their infants. While, in the urban area, only half of the mothers had introduced water to their infants by the end of the third month.

Feeds were introduced later than water to the children, as illustrated by fig 4. In the rural area by the end of the second month of the infant's life, one third of the mothers had started giving complementary feeds to their children. In the urban area, less than a third of the mothers had started giving complementary feeds to theirs children by the end of the third month. These differences in timing of giving either drinking water or complementary feeds between the rural and urban area were significant.

**Fig 4**: Cumulative proportion of mothers introducing first drinking water and first complementary feed to the child according to time after birth (based on mother's recall).




n=265, 84 had not been given feeds or water at the time of the interview

#### 5.3.4.1 *Description of the traditional complementary feeds reported*

Of the complementary infant feeds that mothers reported, many were traditional. The traditional feeds were:

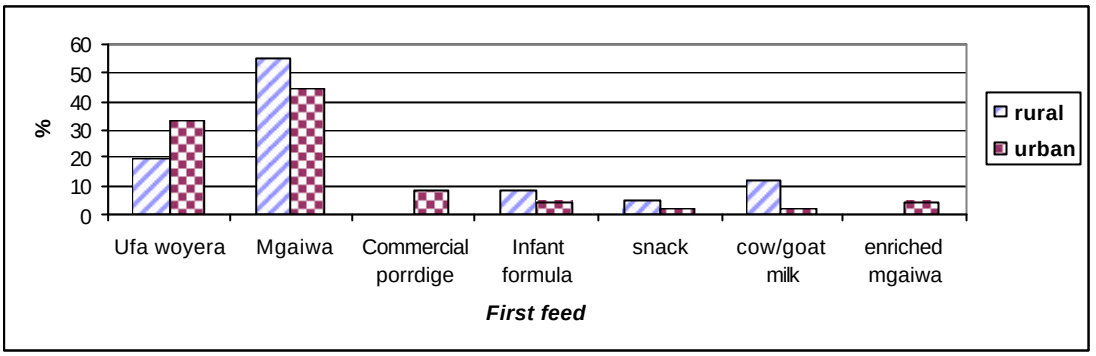
*Ufa woyera* porridge: This is a thin porridge made from refined maize flour with a 60% extraction rate. In the processing of this maize flour, the grain seed coat is removed, and the maize is soaked in water for 2-3 days, then rinsed afterwards, thereafter dried, and finally processed into flour.

*Mgaiwa* porridge: Porridge made from flour of whole maize grain, which has not been processed

Enriched *mgaiwa* porridge: Porridge made from whole maize grain flour mixed with ground nut flour and/or soya bean flour.

*Nsima* porridge: This is hard thickened maize porridge made from either refined maize flour, or whole grain maize flour.

**Fig 5**: First complementary feed given to an infant



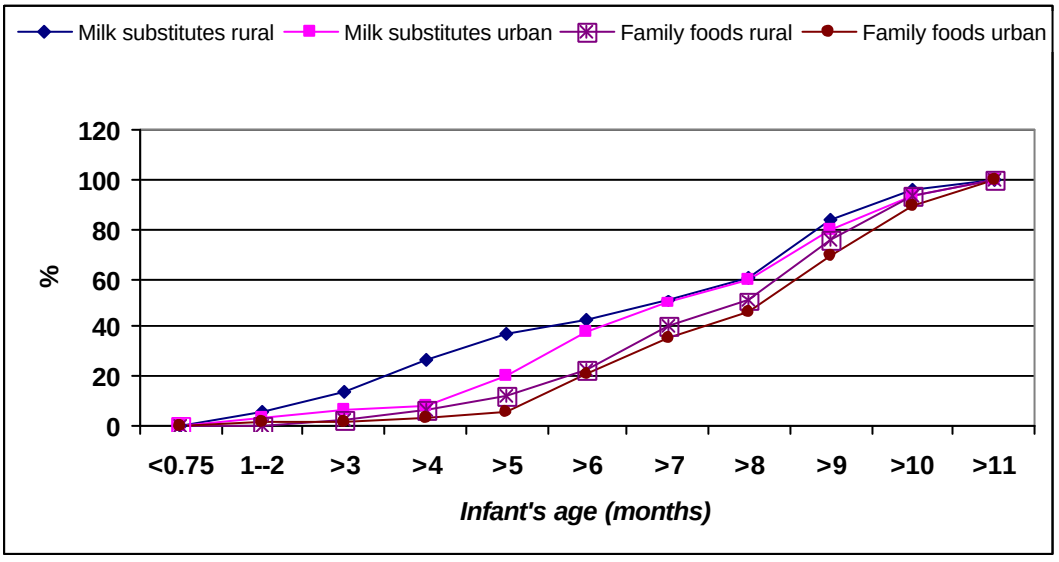

### 5.3.4.2 *First complementary feeds given*

The first type of feed which most mothers (78.7%) both in the rural and the urban area reported to have given to their infant was maize flour-based porridge. Commercial infant cereal porridges and/or maize flour-based porridges enriched with legumes as the first feed to the infant was only given by a small proportion of the urban mothers (fig 5). Giving of breast milk substitutes as the first feed was more prevalent in the rural area than the urban area (fig 5). Few mothers reported having fed fizzy drinks, tea, biscuits to their infant as the first feed. Most mothers who reported having given such snacks to their infant as the first feed were from the rural area (fig 5).

### 5.3.4.3 *Other complementary feeds*

Apart from maize-based complementary porridges mothers also fed their infants family foods and breast-milk substitutes. Milk substitutes were more used among mothers of infants below six months in the rural area than among their counterparts in the urban area (fig 6). However among mothers to infants above six months old, milk substitutes were similarly used both in the urban and rural area. More than half of the infants who were receiving family foods were above six months of age both in the rural and urban area (fig 6).

**Fig 6**: Cumulative proportion of mothers giving milk substitutes and family foods to infants by infant's age in months (based on feeds reported to have already been introduced to the infant at the time of the interview)




Family foods included maize staple and a sauce. n=68 for milk substitutes rural; n=64 for milk substitutes urban;

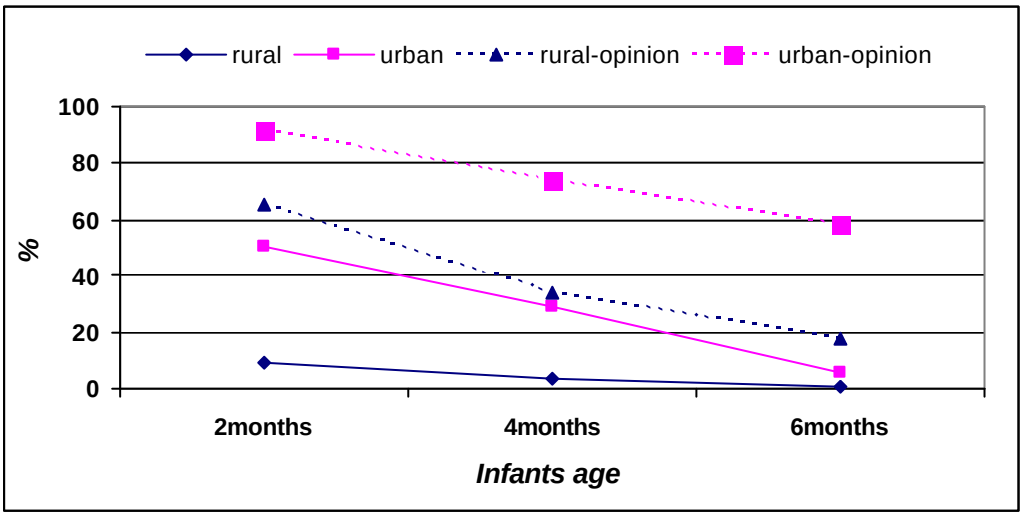
n= 75 for family foods rural; n=68 family foods urban.

## 5.4 Perceptions on infant feeding

### 5.4.1 Opinions on exclusive breastfeeding

There was a significant difference between rural and urban mothers in their opinion on whether exclusive breastfeeding was being practised in their communities or not (Table 6). More mothers in the rural area than the urban area perceived exclusive breastfeeding to be uncommon among their fellow mothers in their community (Table 6). Assuming that mothers would feed their infants according to their perceptions only; exclusive breastfeeding would have been much higher both in the rural and urban area (Fig 7). However, there would still be a difference (significant at $p<0.01$) in the exclusive breastfeeding rate between the rural and urban area (Fig 5). However, reasons which mothers reported as hindrances to exclusive breastfeeding were similarly mentioned by both rural and urban mothers (Table 6).

**Fig 7**: Exclusive breastfeeding rates (opinion versus practice)




#### 5.4.1.1 *Reasons for not exclusively breastfeeding:*

The reason commonly reported by most mothers (Table 6), both in the rural and urban area, on why they thought that other mothers in their communities did not practise exclusive breastfeeding was that the child's crying was taken as a sign of hunger, implying to the mother that the infant was not being satisfied and needed more food. A small proportion of the mothers both in the rural and urban area also mentioned other reasons as illustrated in Table 6. One reason was lack of food, which according to the mother made her produce less breast milk. So they would rather give the little food they had to the child, rather than eat it themselves. Another reason reported was that mothers' perceive the child's throat to be dry as such they would rather give something to the child to drink to soothe the throat. A few also reported that mothers start giving other harder feeds to their children before 6 months, so that the child's body could get firm (a literal translation to English of the vernacular language word used *'limba'* ). Going to school or to work was also mentioned by some of the mothers - which meant they were not available to breastfeed the child. Some also said

they introduced other feeds early, so that the child should get used to other feeds, when they have to go away.

Not many mothers in the sample thought that breastfeeding did not have any benefits. Most mothers in the sample thought that breastfeeding had at least some nutrition or health related benefits (Table 6). Only a few mothers thought of breastfeeding as being beneficial because of social reasons (Table 6). Several social reasons were given as listed in Table 6.

**Table 6:** Mothers perceptions on benefits of breastfeeding; community breastfeeding practices; and reasons for choice of first complementary feed to be given to an infant

| | Rural | | Urban | |
|---|---|---|---|---|
| | n | % | n | % |
| *Reason for choosing the first feed to be given to child* | | | | |
| Food is easy to digest cant cause stomach upset | 70 | 45.2 | 100 | 52.4 |
| Child isn't malnourished coz food is nutritious | 83 | 53.5 | 87 | 45.5 |
| Just follows what people do, culture | 2 | 1.3 | 2 | 1 |
| This food makes child full | 0 | 0.0 | 2 | 1 |
| *Awareness of mothers using alternative feeding methods to breastfeeding* | | | | |
| yes | 12 | 7.7 | 28 | 14.6 |
| no | 144 | 92.3 | 164 | 85.4 |
| *Mothers opinion if other mothers exclusively breastfeed* | | | | |
| yes | 29 | 18.6 | 68 | 36.0 |
| no | 97 | 62.2 | 72 | 38.1 |
| some yes; some no | 30 | 19.2 | 49 | 25.9 |
| *Reasons why other mothers do not exclusively breastfeed* | | | | |
| children cry a lot, coz they are not satisfied | 94 | 76.4 | 89 | 76.1 |
| mother lacks food | 7 | 5.7 | 4 | 3.4 |
| mother has to go to work/school | 3 | 2.4 | 6 | 5.1 |
| so that child's body get stronger | 4 | 3.3 | 4 | 3.4 |
| child has dry throat | 4 | 3.3 | 2 | 1.7 |
| following cultural norms | 11 | 8.9 | 12 | 10.3 |
| *Benefits of breastfeeding* | | | | |
| **Nutrition or health related benefits** | | | | |
| b/milk has all the nutrients for child's body | 11 | 7.3 | 52 | 27.7 |
| breast fed infants do not get malnourished | 117 | 77.5 | 114 | 60.6 |
| delays onset of another pregnancy | 0 | 0.0 | 1 | 0.5 |
| reduces risk of diarrhoeal illnesses | 6 | 4.0 | 8 | 4.3 |
| **Social benefits** | | | | |
| its affordable and easy to make | 0 | 0.0 | 3 | 1.6 |
| to soothe crying child and make child full | 6 | 4.0 | 5 | 2.7 |
| woman looks grown as she breastfeeds | 1 | 0.7 | | |
| it show love to a child | 0 | 0.0 | 3 | 1.6 |
| there is no benefit | 10 | 6.6 | 2 | 1.1 |

### 5.4.2 Replacement feeding as an alternative to breastfeeding

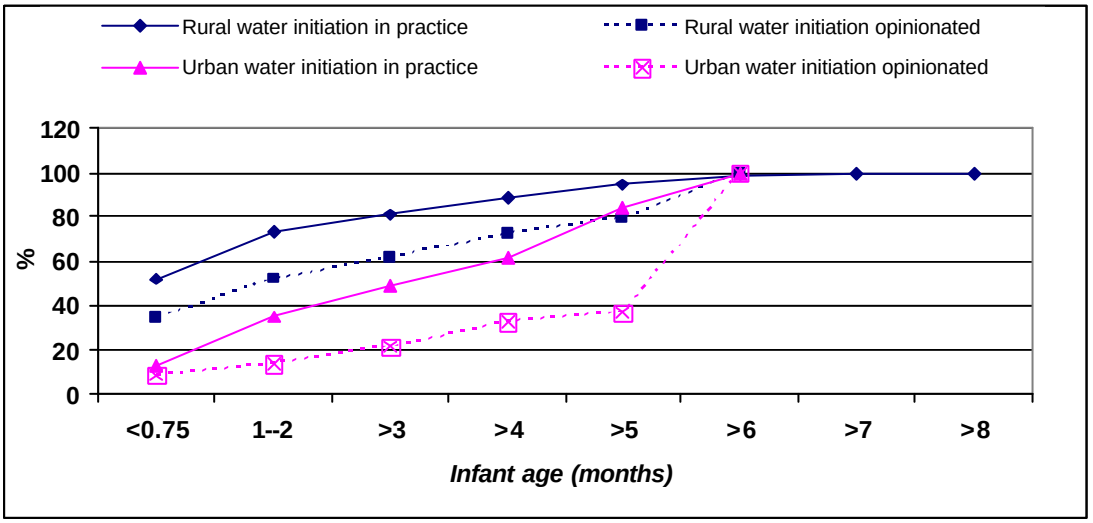
We assessed if some mothers in the study area were practicing replacement feeding as an alternative to breastfeeding. 11.6% of the mothers reported having seen mothers who did not completely breastfeed their infants since birth but gave the infants other feeds instead. Slightly more mothers in the urban area than the rural area reported having seen this (Table 6). However this difference was not significant. When asked what people say about mothers who do not breastfeed at all; in the rural area half of the mothers reported that people felt sorry for such mothers. 16.7% reported that people would say that such a mother is HIV positive. 33.3% said that people neither say negative nor positive comments about such mothers.

In the urban area, 18.5% reported that people would take a mother who is not breastfeeding to be HIV positive. A similar proportion of the urban mothers reported that people would take such a mother as being liberal and modern. 14.8% also said that people would say such mothers do not want their child; and would laugh at such mothers. 11.1% reported that people would not say anything negative or positive about such mothers.

### 5.4.3 Opinions on introduction of complementary feeding

Opinions on when to start giving water or complementary feeds to an infant were significantly different between the rural and urban mothers ($p<0.01$). In the rural area, most mothers opinionated that drinking water should be introduced to an infant before 4 months of age (Fig 8a). In the urban area most mothers opinionated that water should first be given to an infant after 6 months of age. Mothers opinions were however different from their practices both in the urban and rural area. More mothers initiated drinking water to their infants earlier than the right timing according to their opinion (Fig 8a, 8b).

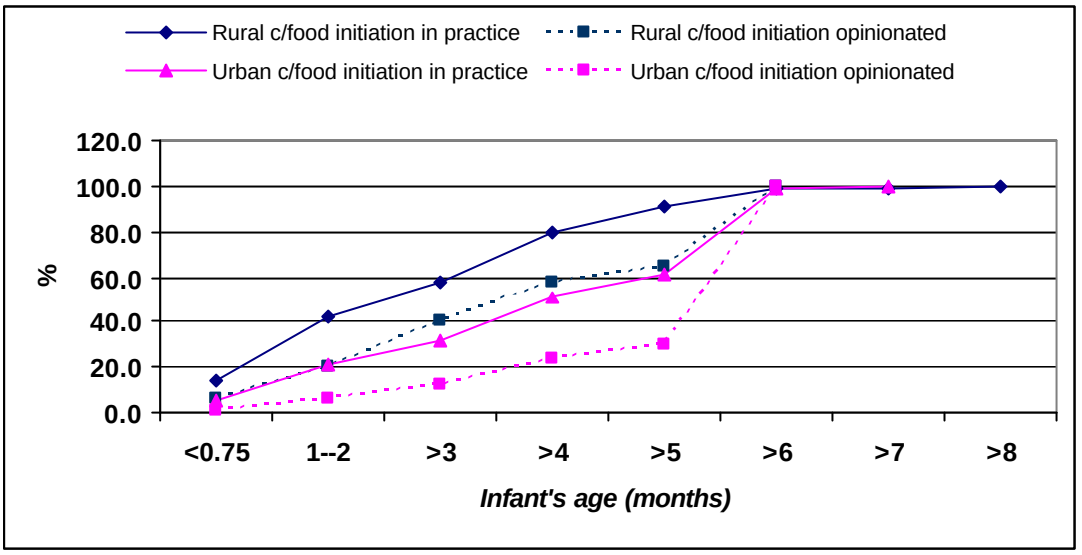
**Fig 8a:** Mothers' opinions and practices in regard to age of child for first introduction of water in rural and urban area (cumulative proportion)




Both in the urban and the rural area mothers opinionated that drinking water should be introduced earlier than complementary feeds. More than half of the rural mothers perceived that by four months an infant should have started on complementary feeds.

Only 20% of the urban opinionated that by four months a child should have been given the first complementary feed. As with drinking water complementary feeds were initiated earlier than mothers' perceived right time (Fig 8b).

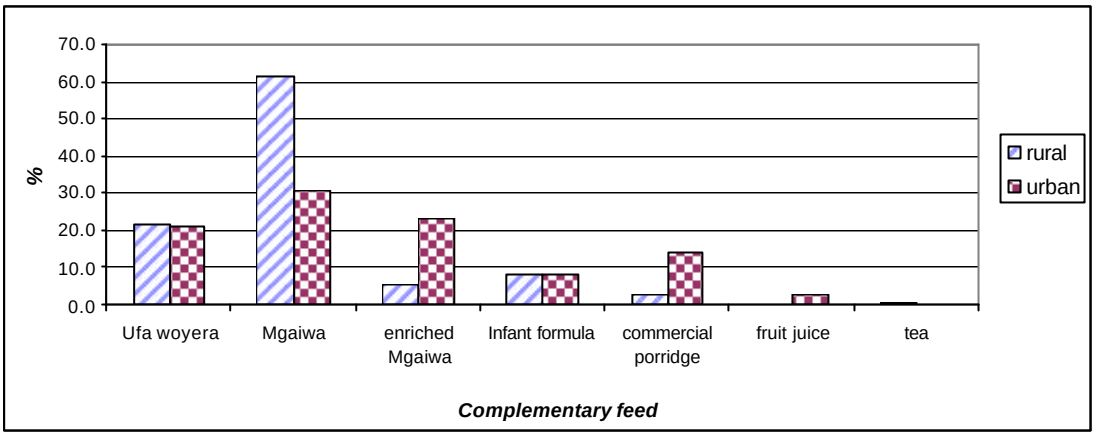
**Fig 8b:** Mothers' opinions and practices in regard to age of child for first introduction of complimentary feeds in rural and urban area (cumulative proportion)




### 5.4.3.1 *Opinion on the first appropriate complementary food*

Most mothers (81.1%) in the sample would have preferred to give their infant traditional maize porridges as the first complementary feed even if they were to have all the money they needed. In practice most mothers (78.7%) similarly reported to have given maize-based porridge to their infant as the first feed. Among mothers in the rural area, more than half expressed that plain whole-grain maize porridge *mgaiwa* was the appropriate first complementary feed for the child (Fig 9). This was similar to what most rural mothers in practice had given as their first feed to the infant (Fig 9). Among the urban mothers *mgaiwa* porridge was also a preferred first feed, but 22% of these mothers stated that *enriched Mgaiwa* porridge was the appropriate first feed (Fig 9). However in practice fewer mothers had given *enriched Mgaiwa* to their infant as the first feed. Not many mothers were of the opinion that commercial porridges or infant formula should be the first complementary feed (Fig 9). The main reasons (listed in Table 6) which mothers gave for perceiving a particular complementary feed as the first feed to be given to an infant were nutrition-related.

**Fig 9:** Mothers opinion on the first complementary feed to be introduced to an infant




### 5.4.4 Opinion on breastfeeding duration

Most of the mothers, both in the rural and urban area had already decided when they were going to wean the child (Table 7). More than half of the mothers were intending to wean the child at precisely 24 months. But, as many as 42% of the rural mothers and 34.5 % of the urban mothers intended to wean after 24 months (Table 7). Main reasons for choosing to wean at a specific time were both infant and maternal related (Table 7).

**Table 7**: Intentions to wean and reasons for choice of the weaning time

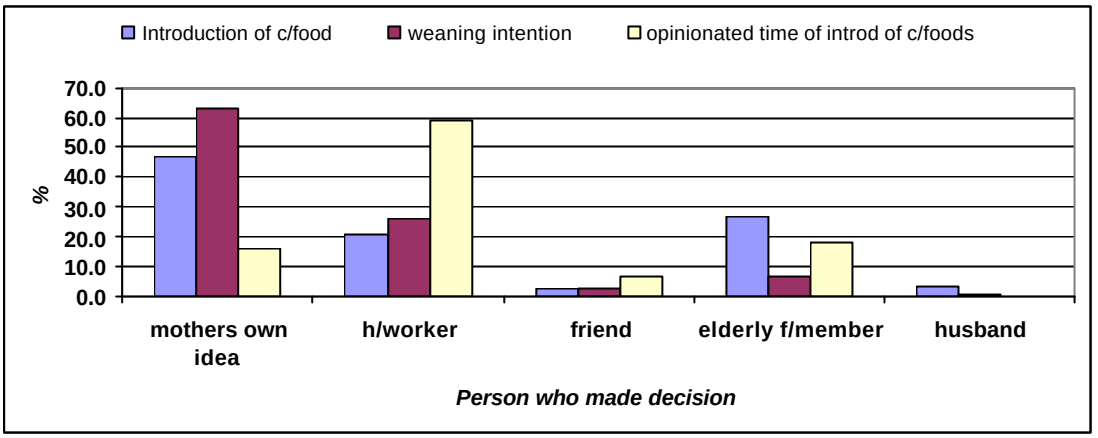
| | rural | | urban | |
|---|---|---|---|---|
| | n | % | n | % |
| Intention on when to wean | | | | |
| yes | 116 | 73.9 | 142 | 74.0 |
| no | 41 | 26.1 | 50 | 26.0 |
| Intended age to wean | | | | |
| at <6 months | 1 | 0.9 | 0 | 0.0 |
| at 6 -11 months | 2 | 1.7 | 1 | 0.7 |
| at 1 - 1.5 years | 3 | 2.6 | 5 | 3.5 |
| at 24 months | 61 | 52.6 | 87 | 61.3 |
| after > 24 months | 49 | 42.2 | 49 | 34.5 |
| Reasons for choice of time for weaning* | | | | |
| **maternal-related** | | | | |
| another pregnancy | 20 | 17.2 | 16 | 11.3 |
| Breast milk difficult to come | | | 2 | 1.4 |
| work or school situation | | | 1 | 0.7 |
| Its difficult to breastfeed a child with teeth | 4 | 3.5 | 3 | 2.1 |
| **infant-related** | | | | |
| child old enough to eat other foods | 61 | 52.6 | 65 | 45.8 |
| so that child should not get malnourished | 29 | 25.0 | 52 | 36.6 |
| prolonged b/feeding passes mother's infections to child | 1 | 0.9 | 2 | 1.4 |
| in case of illnesses child can live on the milk | | | 4 | 2.8 |
| **social** | | | | |
| to make child happy | 3 | 2.6 | 1 | 0.7 |
| lack of other feeds to feed the child | 1 | 0.9 | 1 | 0.7 |
| following health workers advice | 2 | 1.8 | 4 | 2.8 |

* N=258. Rural subgroup n= 116, urban subgroup n= 142. Data are multiple responses, therefore total % ?100.

## 5.5 Influential person in the mother's infant feeding practices, intentions and perception

Another person had decided for nearly half of the mothers on when to start giving the first complementary feeds (fig 10). Elderly family or community members were reported by most of the mothers both in the urban and rural area, as having been the person who made this decision (fig 10). Husbands and peers were the least reported as persons of influence either in initiation of other feeds; intention on when to wean child; and on mothers' opinions on introducing other feeds.

**Fig 10**: Influential person in the mother's decision on the time to give first complementary feed; or wean a child and opinion on when to introduce other feeds to an infant.



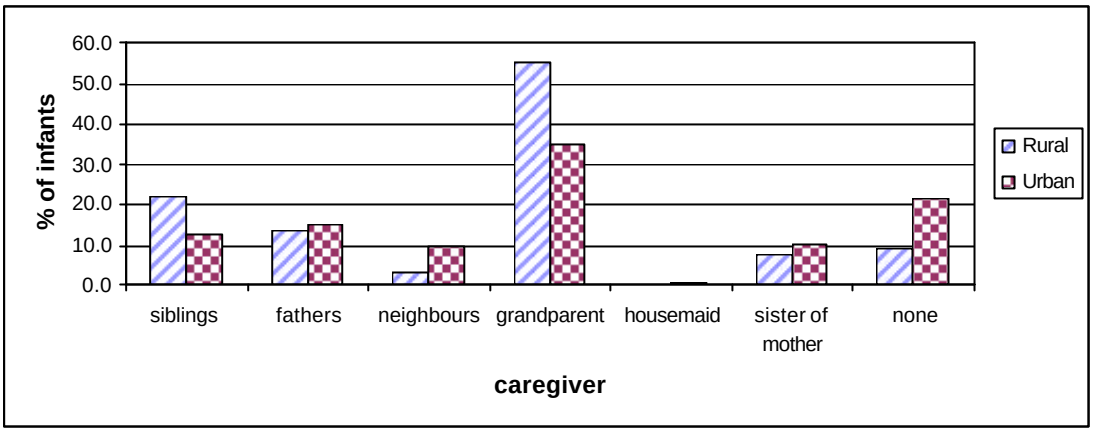

Most mothers made their own decision as when they were going to wean the child. Among mothers who mentioned being influenced by another person in deciding when to wean the child, health workers were reported as the most influential person (fig 10). Fewer mothers in the rural area than the urban area reported having being told by an elderly person on when to wean the child.

Most mothers reported health workers as the person from whom they had learnt when to introduce other feeds to the child (fig 10). Second to health workers, elderly family or community members were mentioned. Friends were the least mentioned. Slightly more mothers in the rural area than the urban area reported to have learnt their opinion from an elderly family or community member.

### 5.5.1 Alternative care providers for infants

In this study we also identified persons who alternatively took care of the infant instead of the mothers in the event that the mother is occupied with other things. Apart from neighbours, caregivers were family-related to the mother (fig 11). Infant's grandmothers' were the most common alternative care givers for infants both before and after 6 months of age. More infants in the rural area were left with alternative caregivers than in the urban area. However in the urban area, more infants were left with alternative care givers after 6 months. In the rural area second to grannies, infants' siblings took care of the infant alternatively. In the urban area second to grannies infants' fathers took care of the infants alternatively (Fig 11).

**Fig 11:** Alternative caregivers for the infants




The most time consuming activity for both the rural (84.7%) and urban (91.9%) mothers for which they left the infant in the care of an alternative caregiver was household work. Apart from cookery and house cleaning, household chores also included fetching water from the water point; fetching firewood from the bush; going to the milling centre to process maize grains into flour. Formal work was a reason for leaving the child with an alternative caregiver for 3.4% of the mothers in the urban area and 2.1% in the rural area. Although most of the rural mothers were peasant farmers (Table 1) only 11.8% of the rural mothers, left their infant with an alternative caregiver when working on the farm. The tendency was to carry the infants to the field. This was noted through some of the interviews which were conducted while the mothers were working in the fields. Only 0.6% of all the mothers left the infant with an alternative caregiver because of sickness.

Fewer mothers in the rural area (8.3%) than the urban area (31.3%) spent all the time in the whole day with the child. This difference was significant.

## 5.6 Infant feeding during sicknesses

All (99.25%) infants were also breastfed whenever suffering from any kind of sickness. The only exceptions were when an infant was seriously sick and had difficulties in breastfeeding. Slightly more infants (20.3%) in the urban area were reported not to have been sick since birth than in the rural area (16.6%).

Mothers were also asked if they still breastfeed when they fall sick. Nearly all mothers (95.9%) breastfed when they were sick. A few of those who were not breastfeeding were having their infants wet nursed (2.3%) Breastfeeding frequency during mothers' sickness was reported to change significantly among the urban and rural mothers. Relatively more mothers in the rural area (42.7%), than the urban area (25.3%), breastfed less often when sick. 4% of the mothers from both the rural and urban area reported breastfeeding their infants more during the time that they were sick. For the rest of mothers from in the urban and rural area their breastfeeding frequency did not change at all in the event that they were sick.

The frequency of illness during the past two months was also assessed. 65% mothers and 72.6% of the fathers had not been sick during the two months preceding the survey. There was no significant difference in the illness frequency.

## 5.7 Awareness and perceptions on Mother-to-child-transmission (MTCT)

Almost all the mothers (98.9%) in the sample had heard about HIV/AIDS and reported at least one method in which HIV/AIDS can be transmitted (Table 8). There was no difference between urban and rural mothers in this respect. Not all mothers who had heard about MTCT were aware about Prevention of Mother-to-child-transmission (PMTCT) as illustrated in Table 8. Significantly more mothers from the rural area were aware about PMTCT. Most mothers (76.2%) were aware of MTCT as occurring through breastfeeding. The process of child birth was the least mentioned (9.7%) method of MTCT among all mothers.

**Table 8:** Mothers' awareness about MTCT, PMTCT, and opinion on whether to breastfeed or not if HIV+

| | Rural | | Urban | | |
|---|---|---|---|---|---|
| | % | n | % | n | p-value |
| Awareness of MTCT | | | | | 0.782 |
| Yes | 88.5 | 139 | 87 | 167 | |
| No | 11.5 | 18 | 13 | 25 | |
| Awareness of PMTCT* | | | | | 0.000 |
| Yes | 77.7 | 108 | 62.9 | 105 | |
| No | 22.3 | 31 | 37.1 | 62 | |
| Opinion on whether to breastfeed or not if HIV+ | | | | | 0.161 |
| would b/feed | 35.7 | 56 | 22.9 | 44 | |
| wouldn't b/feed | 64.3 | 101 | 77.1 | 148 | |
| Reasons for choosing to breastfeed** | | | | | |
| b/milk is best food for infant | 43.8 | 21 | 40.4 | 19 | |
| b/ milk is affordable | 10.4 | 5 | 14.9 | 7 | |
| to prevent people from knowing that one is HIV+ | 2.08 | 1 | 0.0 | 0 | |
| child is already born with HIV | 27.1 | 13 | 19.1 | 9 | |
| there would be no-one to feed infant | 16.7 | 8 | 8.5 | 1 | |
| to show love to child | 8.5 | 4 | 4.2 | 4 | |
| HIV can't be transmitted by b/milk | 8.5 | 4 | 4.2 | 4 | |

* n=139 for rural; and n=167 for urban

** n=56 for rural; and n=44 for urban

All mothers regardless of whether they had indicated that they were aware about MTCT or not, were asked whether they would choose to breastfeed their infant or not if they were found to be HIV positive. The majority of the mothers, of which most were from the urban area said they would not (Table 8). Among the mothers who said they would breastfeed, most common reason given was that breast milk is the best food for the infant. Misconception related reasons like child is already born with HIV and HIV can not be transmitted by breast milk were also mentioned. Other reasons mentioned are listed in Table 8.

## 5.8 Infant nutrition status

**Stunting**

The prevalence of stunting in the total sample was 12.6%. Stunting was highest in the 8 -10 and 3 - 6 months age groups. The mean Z-scores were lower than the NCHS/WHO reference population Z score throughout the first year of life. Rate of stunting was more than double ($p<0.01$) in the rural area compared to the urban area (Table 9); and among those not exclusively breastfed compared to the exclusively breastfed.

**Underweight**

The total sample prevalence of being underweight was 12.6%, similar to that of stunting. Severe underweight was more prevalent than severe stunting or severe wasting. Mean Z-scores were lower than the NCHS/WHO reference population Z score through out the first year except for infants less than 2 months old. Peak rates were at similar age ranges as of stunting and wasting. The prevalence of underweight was five times higher among those not exclusively breastfed compared to those exclusively breastfed; but more than double ($p<0.01$) among rural compared to urban infants (Table 9).

**Wasting**

Wasting prevalence was 6.6% in the whole sample, without any significant difference between rural and urban. Being overweight was relatively higher than other forms of over-nutrition measurable through height-for-age and weight-for-age. This was somewhat more prevalent among rural (9.0%) than urban (7.4%) infants. However, the difference in prevalence of overweight was not significant. Related to this is the higher mean z-score for rural compared to urban infants. Among infants below 4 months old mean z scores were higher than the NCHS/WHO reference population Z score.

**Table 9**: Rates of stunting, underweight and wasting among infants in the sample

| | Height-for-age (stunting) | | | Weight-for-age (underweight) | | | Weight-for-height (wasting) | | | Number |
|---|---|---|---|---|---|---|---|---|---|---|
| | <-2SD* | <-3SD | Mean Z-score | <-2SD* | <-3SD | Mean Z-score | <-2SD* | <-3SD | Mean Z-score | |
| Area of residence | | | | | | | | | | |
| rural | 19.1 | 5.1 | -1 | 19.1 | 7 | -0.68 | 7.7 | 5.1 | 0.07 | 157 |
| urban | 7.3 | 0.5 | -0.34 | 7.3 | 3.1 | -0.29 | 5.8 | 2.6 | -0.07 | 192 |
| Age (in months) | | | | | | | | | | |
| <2 | 6.5 | 2.2 | -0.17 | 6.5 | 2.2 | 0.42 | 4.6 | 2.3 | 0.53 | 46 |
| 2.01 - 4 | 11.4 | 0 | -0.63 | 8.5 | 1.4 | -0.07 | 4.3 | 2.9 | 0.50 | 70 |
| 4.01 - 6 | 10.9 | 4.1 | -0.35 | 12.3 | 2.7 | -0.31 | 13.7 | 8.2 | -0.14 | 73 |
| 6.01 - 8 | 6.9 | 0 | -0.66 | 3.4 | 1.7 | -0.59 | 1.7 | 1.7 | -0.10 | 58 |
| 8.01- 10 | 23.8 | 6.3 | -1.13 | 25.4 | 14.3 | -1.17 | 6.4 | 1.6 | -0.34 | 63 |
| 10.01-12 | 15.4 | 2.6 | -0.84 | 20.5 | 7.7 | -1.14 | 7.7 | 5.1 | -0.59 | 39 |
| Exclusive breastfeeding at 4 months | | | | | | | | | | |
| No | 16.9 | 4.7 | -0.88 | 19.2 | 4.7 | -0.87 | 8.1 | 5.2 | -0.26 | 172 |
| Yes | 6.6 | 0 | -0.27 | 3.3 | 0 | -0.42 | 5.5 | 1.6 | -0.26 | 61 |

Data are %. * Includes infants <-3SD.

## 5.9 Factors associated with exclusive breastfeeding

When exclusive breastfeeding at 4 months was tested for association with socio-economic factors, several factors (those shown in Table 10) were found to be risk factors for not exclusively breastfeeding as follows: living in the rural area; having an unsafe source of drinking water; father having a relatively low income job; birth of infant outside a health facility; living in a grass thatched house; mother being unemployed; having a drinking water source of more than 10 min walking distance; father being illiterate; household experiencing food shortage, having assets of poor monetary value; mother being illiterate.

Given the significant difference between the rural and urban populations in the sample, separate analysis for the rural and urban populations was also done. However, when the rural and urban populations were analysed separately, fewer socio-economic factors were associated with exclusive breastfeeding respectively for each of the two groups.

For the urban population, father having a relatively low income job; infant being born outside a health facility; experiencing food shortage; mother being below 25 years of age; an unsafe source of drinking water of birth; obtaining drinking water more than 10 min walking distance; were found to be risk factors for not exclusively breastfeeding as illustrated in Table 10. In the rural sample, only living in a grass thatched house was found to be a risk factor for not exclusively breastfeeding.

Several socio-economic factors were found not be associated with exclusive breastfeeding at 4 months as follows: mother's age; mother's marital status; child spacing between infant in the study and one immediately after; number of children under five years old in a household; total number of people in a household; time father spent at home- whether the father was living in the household where the infant was or was living away; time taken to fetch water.

### 5.9.1 Predictors of exclusive breastfeeding at 6 months

All factors found to be significantly ($p<0.05$) associated with exclusive breastfeeding were computed in a model for predicting exclusive breastfeeding at 4 months using logistic regression. Predicting factors for exclusive breastfeeding at 4 months, in order of significance were: area of residence-either rural or urban; infant's place of birth, mother's literacy (Table 11).

When rural and urban populations were analysed separately, type of house was found to be the only predictor for exclusive breastfeeding at 4 months for the rural population. For the urban population for time for fetching water was the predictor of exclusive breastfeeding.

**Table 10:** Factors associated with exclusive breastfeeding in bivariate analysis

| Background factor | Exclusive breastfeeding rate | | OR | CI |
|---|---|---|---|---|
| | n | % | | |
| Child's age | | | | |
| over 6 months | 38 | 23.8 | 1 | |
| under 6 months | 23 | 12.2 | 0.45 | (.25 - .79) |
| Area of residence | | | | |
| rural | 5 | 3.2 | 1 | |
| urban | 56 | 29.2 | 12.52 | (4.87 - 32.16) |
| Mothers opinion | | | | |
| excl. b/feeding less than 6 months | 19 | 9.1 | 1 | |
| excl. b/feeding until 6 months | 42 | 30 | 4.29 | (2.37 – 7.76) |
| Value of assets owned | | | | |
| poor | 52 | 17.6 | 1 | |
| well off | 9 | 17 | 0.96 | (0.45 – 2.08) |
| House roof | | | | |
| grass thatch | 38 | 13.8 | 1 | |
| iron roof | 23 | 31.5 | 2.88 | (1.58 – 5.25) |
| Food shortage | | | | |
| experience food shortage | 25 | 12.9 | 1 | |
| no food shortage | 36 | 23.2 | 2.05 | (1.17 – 3.59) |
| Place of birth | | | | |
| outside health facility | 6 | 5.5 | 1 | |
| within health facility | 55 | 23.1 | 5.21 | (2.17 – 12.51) |
| Time for fetching water | | | | |
| >10min | 8 | 7.4 | 1 | |
| <10min | 53 | 22 | 3.52 | (1.6 – 7.7) |
| Father's job | | | | |
| petty job | 7 | 6.4 | 1 | |
| smaller trader/perm. employed | 46 | 25.3 | 4.98 | (2.16 – 11.48) |
| Mother's job | | | | |
| working | 23 | 11.9 | 1 | |
| not working | 38 | 24.4 | 2.38 | (1.35 – 4.2) |
| Drinking water | | | | |
| unsafe drinking water | 1 | 1.5 | 1 | |
| safe drinking | 60 | 21.3 | 17.84 | (2.43 - 131.18) |
| Age of mother | | | | |
| 16 - 24years | 31 | 17.1 | 1 | |
| 25 - 45 years | 30 | 17.9 | 1.05 | (0.61 – 1.83) |
| Literacy of father | | | | |
| no | 8 | 7.6 | 1 | |
| yes | 45 | 24.1 | 3.84 | (1.74 – 8.5) |
| Literacy of mother | | | | |
| no | 18 | 9.8 | 1 | |
| yes | 43 | 26.1 | 3.25 | (1.79– 5.9) |

**Table 11**: Independent predictors of exclusive breastfeeding at 4 months in multivariate analysis

| | OR | CI |
|---|---|---|
| Living in the urban (vs rural) | 8.14 | (2.72 - 24.34) |
| Birth in a health facility (vs outside health facility) | 2.91 | (1.06 - 8.05) |
| Literate mothers (vs illiterate) | 2.14 | (1.06 - 4.32) |

## 5.10 Factors associated with infant's nutritional status

All socio-economic factors were tested for their association with all the three nutrition status indicators. Living in the rural area, mother being trader/employed, and mother being illiterate were found to be risk factors, with similar value of risk, for both low weight-for-age and low height-for-age (Table 12). Being born outside a health facility and having an unsafe source of drinking water, and not being exclusively breastfed at 4 months were found to be risk factors for only low weight-for-age (Table 12). Experiencing food shortage; and being a divorced or widowed or single mother were found to be risk factors for only low height-for-age (Table 12). No factors were found to be associated with low weight-for-height.

**Table 12**: Factors associated with weight-for-age and height-for-age in bivaraite analysis

| Background factor | % with low wt-for-age or low ht-for-age | n | Bivariate OR | 95% CI |
|---|---|---|---|---|
| *Factors associated with low wt-for-age and ht-for-age* | | | | |
| Area of residence | | | | |
| rural | 19.1 | 30 | 3.00 | (1.53 - 5.89) |
| urban | 7.3 | 14 | 1 | |
| Mother's job | | | | |
| petty | 8.3 | 13 | 2.11 | (1.06 - 4.18) |
| proper | 16.1 | 31 | 1.00 | |
| Mother's literacy | | | | |
| illiterate | 16.3 | 30 | 2.10 | (1.07 - 4.12) |
| literate | 8.5 | 14 | 1.00 | |
| *Factors only associated with low wt-for-age* | | | | |
| Place of birth | | | | |
| outside h/ facility | 20 | 22 | 2.46 | (1.29 - 4.66) |
| in a health facility | 9.2 | 22 | 1 | |
| Drinking water | | | | |
| unsafe | 20.9 | 14 | 2.22 | (1.10 - 4.47) |
| safe | 9.2 | 30 | 1 | |
| Exclusive breastfeeding at 4 months | | | | |
| No | 19.2 | 33 | 5.037 | (1.185 – 21.40) |
| Yes | 3.3 | 2 | 1 | |
| *Factors only associated with low ht-for-age* | | | | |
| Food shortage | | | | |
| >1 month food short. | 17.5 | 16 | 3.08 | (1.47 - 6.46) |
| no food shortage | 6.5 | 10 | 1 | |
| Marital status | | | | |
| divorce/widow/single | 25 | 9 | 2.65 | (1.15 - 6.09) |
| married | 11.2 | 35 | 1 | |

When the rural and urban groups were analysed as independent samples, having a drinking water source in a place which takes a relatively longer time (>10min) to walk and having the infant spaced less than 2 years from the one before it were risk factors for low height-for-age among the rural infants. No factors were found to be associated with either low weight-for-age or low weight-for-height among the rural or urban infants when rural and urban groups were analysed separately.

***Predictors of malnutrition***

When all the associated factors ($p<0.05$) with the malnutrition indicators were computed in a logistic regression model, low weight-for-age was found to be predicted by area of residence –living in the rural area. Low height-for-age was predicted by food insecurity and living in the rural area. When rural and urban groups were analysed separately, being a single mother was found to be a predictor of low height-for-age among rural infants. No factors were found to predict low weight-for-age or low weight-for-height in the separate analysis for rural and urban groups.

**Table 13**: Independent predictors of low weight-for-age (being under weight) and height-for-age (stunting) in multivariate analysis

| | OR | 95% CI |
|---|---|---|
| *Factors predicting low weight-for age* | | |
| Living in rural (vs urban) | 3.03 | (1.54 - 5.94) |
| *Factors predicting low height-for-age* | | |
| Living in the rural (vs urban) | 2.54 | (1.27 - 5.05) |
| Food shortage (vs no food shortage) | 2.56 | (1.20 - 5.45) |

# Chapter six: Discussion

In this study we found the rate of exclusive breastfeeding in the total sample to be 3.4% at 6 months. At 4 months and 2months the rates were 17.5% and 32.1% respectively. Rates of exclusive breastfeeding were significantly higher in the urban than the rural area. Pre-lacteal feeding, discarding of colostrums were uncommon. However, giving of herbal water to infants within the first week of birth was more common in the rural than the urban area. Place of birth, living in the rural area and mother being literate were independent predictors of exclusive breastfeeding at 6 months.
The urban mothers were of relatively better socio-economic status than the rural mothers. More mothers both in the urban and the rural area perceived exclusive breastfeeding to be beneficial although in practice less of them practised it. Infant's crying inferred to be hunger by the mother was indicated as the main reason why mothers do not exclusively breastfeed by 78% of the mothers both in the urban and the rural area.
12.6% of the studied infants were stunted and underweight while 6.6% were wasted. Rates of stunting, being underweight, and wasting were significantly higher in the rural than the urban area.

## 6.1 Methodological discussion

### 6.1.1 Strengths of the study

***Pre-testing on a larger number of respondents***

We pre-tested our questionnaire on 40 eligible mothers in non-selected wards in the study area. This enabled us to obtain a wide range of possible answers for our close ended questions; and have pre-coded answers which are as realistic as possible. We were also enabled to adapt our questions to as many cultural or religious beliefs as possible.

***Researcher as enumerator***

All the interviews were conducted by the researcher herself. This has had a positive bearing on the reliability of the results in that, the researcher was well acquainted with the study objectives and ensured that respondents had understood well the interview questions in the light of the objectives of the study, before recording the respondents answers. This also provided the researcher with some qualitative insights through observations; which have been useful in interpreting the findings in the discussion.

### 6.1.2 Limitations of the study

***Measurement of exclusive breastfeeding***

*Mother's recall*

Exclusive breastfeeding in the study was determined in two ways: by asking mothers if they have ever given any feeds to the infant since birth; and for those who have given any feeds to retrospectively ask when the first feed was given.
Both of the methods for determining exclusive breastfeeding relied on mothers' recall. In the initial method mothers had to recall if at least there has been any non-

breastfeeding feeding event for the infant. In the other method for mothers who had had non-breastfeeding feeding events, mothers had to recall which one of all the non-breastfeeding events was the first and the timing for the event. Basing on the fact both methods used mothers recall and that recall error may introduce bias in study findings; there could be a possibility of bias in our estimates for exclusive breastfeeding rates. Nevertheless there is a possibility that the bias might not have been as highly significant. Launer et al in a cohort study among Arabic mothers of low socio-economic status found that maternal recall of infants feeding events up to 18 months of age is accurate(50). The researchers' own experience with the interviews she had was that mothers' reports of their infant's age were found to be accurate when crosschecked with the infants' health card. In addition mothers would use other major events in the infants' life or their own life; like timing of a major sickness- in some instances timing of such events would be checked from health cards- as time mark from which to measure a feeding event. Therefore mothers' recall was a minor limitation in our study.

*Use of two different methods*

The use of two different methods to estimate the exclusive breastfeeding rate might have also been a source of additional bias for our estimated exclusive breastfeeding rates. The precision of each of the two methods is different; as such each of the two methods might have introduced different levels of error in the estimation of exclusive breastfeeding rates. Such kind of inconsistent standard errors can be a probable source of bias in multivariate analysis. Therefore there could be a possibility that the factors we have found as being independent predictors of exclusive breastfeeding might be biased and that other relevant factors could have been found insignificant.

***Use of quantitative method***

Use of quantitative methods in studying perceptions was a limitation to the perception related findings of our study. In our study, although face-to –face interviews were used, questions which were asked to mothers on perceptions had pre-coded answers. Subjects verbatim for additional coding was only recorded where subjects' responses were outside the pre-coded responses. Close ended questions were used instead of open-ended questions which could have been an option, because of the large sample size hence extra work with coding after all the interviews are finished. This approach was less open to the subject's views and might have had the researcher's bias of trying to fit subjects' views in the already defined codes. In addition to being more open to respondent's views, qualitative methods are flexible and pick up unexpected emerging issues in interviews(51). Although our perception-related findings might not give a detailed understanding of the perceptions as they would have been if qualitative methods were used, they still give us a general overview of mothers' opinions on infant feeding.

***Use of a bathroom scale for measuring infants' weight***

Infants weights in our study were measured a digital bathroom scale. However this is not the standard scale for measuring weights for infants. Weight measurements on a bathroom scale can vary depending on the posture of the person while standing on the scale. It is recommended that infants should be measured using beam scales or pan-type paediatric scales(52). Therefore the use of sub standard scale might have been a source of bias in the estimation of the infant's nutritional status and further the estimation of the rate of malnutrition.

***Urban vs rural definitions.***

Our definitions of 'urban' and 'rural' were based on proximity to town infrastructure and did not consider living conditions of the subjects in defining the area of residence. In our analysis, urban dwellers were treated as one group regardless of the differences which can be there between urban sub-groups like the 'urban poor' or 'urban middle class'. Therefore this hasty grouping of all urban dwellers as one, limits the urban settings for which our results could be inferred to.

***Sample size***

We did not manage to have our planned number of rural-based subjects, which would have been similar to our urban-based subjects. This was due to logistic constraints. However, given the socio-economic homogeneity observed in the rural area; we would assume that, even if we had an equal number of rural-based and urban based subjects, our results could not have been very different. Further to this, an increase in sample size does not directly translate to increase in reliability. However this does not nullify the possibility of different results if the more rural-based subjects could have been included in the study.

***One-stage cluster sampling***

Selection of research subjects was through one stage cluster sampling where all mothers who qualified and were willing were recruited into the study. Randomisation was minimised in this one stage way of sampling. Our sample could have been more probabilistic if a two-stage sampling method was used where subjects could have been randomly selected in the 'randomly selected clusters'. Lack of this type of randomisation can be a probable source of bias given that differences although minor might exist between cluster residential settings like villages.

### 6.1.3 Confounding factors

***Birth weight***

Birth weights of infants in our study were not recorded. Catch-up growth for infants with low birth weight can not happen over very short periods of time. As such, low birth weight infants who are in the catching up phase and gaining satisfactory weights for catch-up growth could have been found as being malnourished in our study, as we did not have birth weights with which to compare our recorded weights.

***Maternal nutritional status***

Infant nutritional status is influenced by maternal nutritional status; as maternal nutrition affect's the infants' nutrition and growth in utero. After birth, the nutrient composition of the breast milk which is an infant's main food is also affected by maternal nutrition(15). In our study we only had data on maternal weight, which is insufficient for calculating maternal nutritional status; which could have been confounding to some of the factors found as significant predictors of infant's nutritional status.

***Ante-natal clinic and/or growth monitoring clinic attendance***

In ante-natal or growth monitoring clinics and at child birth mothers are provided with information on infant feeding practices. However, in our study we did not assess whether mothers had been attending ant-natal/ growth monitoring clinic or not. Controlling for this factor could have probably given us increase in precision in our

analysis; given that place of birth was found to be a significant predictor of breastfeeding.

## 6.2 Discussion of the findings of the study

### 6.2.1 Breastfeeding practices

***Exclusive breastfeeding***

The exclusive breastfeeding rates we found (3.4% at 6 months) were higher than the rates found in a recent study in selected peri-urban communities of South Africa, where they had found the exclusive breastfeeding to be 0% at 6 months . The exclusive breastfeeding rate we found at 4 months was also higher than the exclusive breastfeeding in a study in Tanzania in 1999. Both the South African and the Tanzanian study(30;41) were cross-sectional studies where infants from 0 -6 months were used. In Africa Nutrition Chartbooks where DHS data from different countries are compared, Malawi was among the first ten countries ranked in order of high exclusive breastfeeding rates(53).

Exclusive breastfeeding rates in our study were lower than the national rate based on the 2000 Malawi DHS but higher than the national rate in 1992 (based on 1992 DHS data). DHS data are collected using similar methodology. In the case of the Malawi DHS, 24-hr recall was used in both surveys. Therefore the differences in exclusive breastfeeding rates between our study and the DHS (2000 and 1992 separately), might more likely be verifying the trends of increase in exclusive breastfeeding rate which is what the DHS data (2000 and 1992) point out to. There has been a lot of campaign for promotion of exclusive breastfeeding in Malawi, including the studied area since the BFHI was launched; hence a trend towards increase in exclusive breastfeeding, although in general the rates are low. In relation to this, the exclusive breastfeeding rate for the rural community alone, was higher than the exclusive breastfeeding rate found in a cohort study carried in the same area in1995-96(43). In the 95-96 study, exclusive breastfeeding was found to be 0% by 4 months. In spite of methodological differences between our study and the 1995-96 study (cohort, mothers followed from prenatal); it is likely that the general improvement in people's livelihood and health services in the area have had an impact. In the 95-96 study, literacy in the sampled population, who were a self-selected group of mothers attending the antenatal clinic, was at 13.8%. In this study, which was community- based, literacy was twice as high among the sampled population.

In the context of HIV/AIDS, the exclusive breastfeeding rates we found were low. Current PMTCT only recommend replacement feeding where it is feasible, acceptable and safe. For developing countries settings like our studied area, replacement feeding cannot be an option. Exclusive breastfeeding is a feasible, less stigmatizing and safe way of feeding infants. Therefore in HIV/AIDS affected communities like our study area, it is risky if exclusive breastfeeding is a rare way of feeding infants as we have found in our study, given the risk of mixed feeding in MTCT.

### 6.2.2 Other breastfeeding practices

***Pre-lacteal feeding***

Pre-lacteal feeding was uncommon, although a qualitative study (unpublished), of infant feeding practices in Mangochi district carried out in 1992 alluded to it. The qualitative study was conducted around the same time when the BFHI was launched in Malawi, but before it was started in the study area. The study was done as a baseline for a different breastfeeding promotion program (Community Health Partnerships), in the study area. In studies in Tanzania and Sudan, pre-lacteal feeding was found to be practised by 30% and 64% of the mothers, respectively (29;30). The present low level of pre-lacteal feeding among the studied mothers could in a way also point out to improvement in the trends of breastfeeding practices in the study area.

***Initiation of breastfeeding***

Rate of initiation of breast feeding within the first hour of delivery was almost similar to rates found in the 2000 Malawi DHS (1), and a cross-sectional community-based study in Tanzania . The rate we found was 68%. There was no difference between the rural and urban mothers in the rate of initiating breastfeeding within the first hour of delivery. Delays in initiating breastfeeding were not beyond 5 hours both in the rural and urban area. However, in the Tanzanian study, and a study conducted in Sudan early breastfeeding initiation rates were higher among the urban than the rural mothers(29;30).

The 2000 Malawi DHS and a cross-sectional study in South Africa had found higher early breastfeeding rates among health facility based births than home births. However in our study there was no difference in early initiation of breastfeeding rate between health-facility based births and home births. Given the high number of home births in our studied area, this is a positive finding(41).

***Discarding of colostrum***

Discarding of colostrum, a practice reported to be common in studies in Tanzania and Nigeria(30;33), was nearly absent in the studied population. As a practice, discarding of colostrum is reported as being cultural belief based(33).

***Breastfeeding on demand***

Breastfeeding on demand was the norm among all the studied mothers, as also found in other African studies(29;30;54;54). This is a positive finding as breastfeeding on demand is beneficial because it enables increased milk production (15).

***Herbal water***

An unexpected finding in the study was that most of the infants from the rural area were being given herbal medicinal water (prepared with unboiled water) within the first week of life; as preventive medicine against tetanus. This is a risky practice given the fact it may expose the infant to increased risk of enteric infection(22;55). However, the giving of herbal water also signifies the value of cultural beliefs in feeding infants in the study area. The herb being used was also used in medicinal preparations for other purposes other than tetanus in children. Adherence to infant feeding cultural norms like giving of herbal (medicinal) water have also been found in other studies (39;41).

### 6.2.3 Initiation of feeds

Water supplementation tended to start earlier than feeds' supplementation. This can possibly be explained by the fact that mothers themselves perceived that water should be introduced earlier to infants than feeds. Giving infants water in the first few months of life was also observed in studies conducted in South Africa, Tanzania and in the 1995-96 Lungwena cohort study (30;41;43). However, both water and feeds were introduced far much earlier in the rural area than the urban area, as similarly found by Shirima in Tanzania(30).

Plain (not enriched) maize-based porridges were mostly used as the first complementary feed as opposed to commercial porridges or legume mixed maize porridges. The nutritional quality of plain maize porridges is poor. Maize has low contents of energy, protein and zinc of which both are critical for growth. The porridges have 7 – 10% dry matter, and therefore they are bulky and of low nutrient density in general (24;56). This might imply unmet nutritional needs at the time when complementary feeds are being introduced.

Most of the rural mothers unlike the urban mothers, perceived this plain maize porridge as indeed being the rightful first feed for the infant. Preference to giving legume enriched maize porridges as the first feed was also alluded to by some of the urban mothers unlike the rural mothers. The use of the maize porridges is due to the fact that the population studied is a maize eating population. Therefore, mothers are more familiar with these than any other feeds. Similarly a hospital based study in a town in Nigeria found traditional feeds as the common complementary feed given to infants(54). However, the mention of preference for legume enriched porridges among the urban mothers; although not many were using the enriched porridges; could also point out to economic constraints as being the reason for the urban mothers' present use of the un-enriched porridges. Mothers preferences for a complementary food as being the best to be first given to an infant were on reasons on how good they perceived it to be for the infant, for instance that would not upset infant's stomach or that it is nutritious enough for the infant's needs. Factors like availability and affordability of a food were not reported as constraints as was reported in the Nigerian study(54).

Most mothers both in the rural and urban area were giving family foods to the infant between the $8^{th}$ and $9^{th}$ month. The 2000 Malawi DHS reported similar times by which infants are fed family foods. In the 1995-96 Lungwena study similar times were reported. Family foods were not diverse, implying unmet nutrition needs; more likely micronutrients. Lack of diverse diets for infants was similarly reported in the 1995-96 Lungwena study and in a study in rural Tanzania (39;43).

### 6.2.4 Factors associated with exclusive breastfeeding

***Rural-urban differences***

The exclusive breastfeeding rate at 6 months in the urban area was six fold higher than in the rural area; and logistic analysis showed that living in the urban area was a predictor for exclusive breastfeeding. This large difference in exclusive breastfeeding between the rural and urban area was to a larger extent due to a difference in early water supplementation than early feeds supplementation (hence relatively smaller difference in predominant breastfeeding than in exclusive breastfeeding between rural

and urban). High exclusive breastfeeding in Mangochi urban could be explained by the high campaign for such feeding through programmes like Community Health Partnership (for details refer to the introduction), in addition to the BFHI. In Mangochi Township there is also a community based women's group, which promotes exclusive breastfeeding. In contrast, at Lungwena health centre there were no additional programs with a specific focus for promotion of exclusive breastfeeding other than the BFHI. Additional programs which were going on were research projects. In spite of the BFHI, not all the workers at the centre had been oriented on exclusive breastfeeding. The baby friendly hospital initiative has been associated with an increase of exclusive breastfeeding rate from 2% to 22% in Nigeria over a decade since the programme was initiated (46).

***Bio-social factors***

Place of birth was found to be an independent predictor of exclusive breastfeeding, although not associated to time of initiation of breastfeeding. A possible explanation to this could be that mothers delivering in health facilities are given advice on infant feeding, of which, breastfeeding is included. In addition the mothers are also scheduled into postnatal check-ups for the infant, where among other things infant's feeding problems can be discussed. This kind of service would not be available for those giving birth at home. In a study of mothers of varying socio-economic background in Nigeria, delivery in a tertiary or secondary health facility was found to predict exclusive breastfeeding(46). In the 95-96 Lungwena study delivery in a health centre was also found to be a predictor of exclusive breastfeeding(43).

***Demographic factors***

Mother's literacy was also found to be an independent predictor of exclusive breastfeeding. This was similarly found in the 1995-96 Lungwena study(43). In a cross-sectional study among mothers of infants below 6 months in Ghana, higher education was found to predict exclusive breastfeeding(27). This finding further confirms already known information of importance of maternal education in infant nutrition.

Although in other studies in Africa being a young mother has been found to be associated with exclusive breastfeeding(46) in this study, being a young mother was only associated to breastfeeding in bivariate analysis for urban mothers, when rural and urban were analysed separately. And that significance was lost in multivariate analysis.

***Socio-economic factors***

Bivariate analysis indicated that food security was a significant predictor of exclusive breastfeeding although this association was lost in multivariate analysis. In the 95-96 Lungwena study, being born in post-harvest months was found to be a predictor of prolonged breastfeeding(43). A study among a rural population of Tanzania, found lack of rain, (impact of infants' age was controlled for) which is a negative factor for food availability in agricultural communities, to be a predictor of introduction of maize based porridges(39).

This association of food security to exclusive breastfeeding can seemingly be understood by the mothers' explanation in reporting food security as a hindrance to exclusive breastfeeding (Table 6): The mother perceived their milk production to be less when they were starving as such they would rather give the little food they have

to the infant than take it for themselves and also produce little milk. In addition to this, during times of food insecurity mother along with other household members have to work harder as they have to find food. A number of studies however show that even when mothers are moderately undernourished, breast milk production can be maintained at levels sufficient enough to satisfy infant needs, at least in the first six months of an infants life(15). But, basing on the data we have, which does not include data on maternal nutritional status and milk production, it is impossible to say whether among the studied women introduction of other foods due to food unavailability would have been necessitated by energetically induced milk insufficiency; or not.

Although mother's work was associated with exclusive breastfeeding, it was not a significant predictor of exclusive breastfeeding. This is different from other African studies(43;46) However, this can be explained by the fact that the main occupations of mothers in this study were informal i.e. farming and small scale trading; and mothers would carry with them their infants on the back when going either to the farm or market for trading. As such their going to such places might not have been depriving them of the chance to breastfeed. This was also noted by researcher when she conducted some of the interviews in the farms where the mothers were working, and had put their infants in grass thatch shades or under the tree. However, in carrying out household chores, like going to the maize milling centre, fetching firewood; and water mothers would leave infants behind with alternative caregivers.

In this study when the rural population was analysed separately, type of house, was found to be a predictor of exclusive breastfeeding. This association could imply that mothers of better socio-economic status are more likely to exclusively breastfeed, than their counterparts of lower socio-economic status. This has also been found in other studies in African societies, Mexico, Europe (30;43). Iron roofed houses are more costly to construct than grass thatched houses. Just like in many of the Malawian communities iron roofed houses are therefore a symbol of wealth and status. Although in the Lungwena 95-96 study more factors were found to predict exclusive breastfeeding, the factors were mostly socio-economic indicators(43).

### 6.2.5 Breastfeeding duration

The intended weaning time was found to be at least at 2 years or beyond; with more rural than urban mothers planning to continue breastfeeding after the two year mark. A cross sectional study among rural and urban mothers in Tanzanian found similar time periods; although that was in practice and not the mothers plans for breastfeeding duration (30). However, other studies in South Africa, Botswana, Sudan found that mothers were breastfeeding for relatively shorter durations than the intended duration found in our study(29;41;57). In the Sudanese study breastfeeding duration was shorter among the urban than the rural mothers. Similarly shorter breastfeeding durations were found among Nigerian mothers of high socio-economic status and education(46;54). However planned weaning time-which was what this study established- can only give a vague impression of what the actual weaning time would be like in practice, as discrepancy has been shown between mothers' plans of infant feeding events and the execution of the plans(39).
Main reasons for weaning found in the present study were infant focused. Some studies carried out among mothers of either better or lower socio-economic status in

South Africa, Tanzania and Sudan, Kenya also reported similar reasons (29;30;40;41).
In this study maternal social constraints like work and school were least reported as reasons for weaning children. This could also be more likely because only few of the interviewed mothers were students or working in formal regular jobs.

### 6.2.6. Infant feeding during infant's sickness

Breastfeeding was reported to be continued during infant's sicknesses regardless of the type of sickness. In addition, most of the mothers perceived it right to breastfeed an infant who has diarrhoea. This is contrary to a Sudanese study where mothers stopped breastfeeding when an infant had diarrhoea(29). Given that infant morbidity is quite high in resource poor communities, like the study area, the practice of continuing breastfeeding when an infant is sick; is a good indication of available nourishment and reduced risk for malnutrition because of infant's sicknesses.

### 6.2.7 Infant feeding during mother's sickness

Sickness frequency among the mothers two months preceding the survey was similar both among the rural and urban mothers; with most of the mothers having been sick at least two months preceding the survey. However, more rural than urban mothers breastfed their infants less when they were sick. This could possibly be explained by the fact that most of the rural infants were already receiving feeds at an early age unlike the urban infants. As such, when the mother fell sick, the infant would still get something to eat without the mother being obligated to maintain the same breastfeeding frequency as when she is normal.

### 6.2.8 Mothers' perceptions vs infant focused cues

Most of the urban mothers, unlike the rural mothers had the opinion that complementary feeds should be introduced to the infant after the recommended time of 6 months. There was a slightly similar trend in the number of mothers whose opinions were that an infant has to be exclusively breastfed for the first 2 or 4 or 6 months and those who had actually practised exclusive breastfeeding for the same periods of time. Nevertheless, most mothers were introducing complementary feeds earlier than the times in which they had thought of (opinionated) as the right time. This finding might be pointing out to the fact that mothers' 'right' opinions and perception related factors about infant feeding might not necessarily lead to the appropriate infant feeding practices, although they are an influential factor, as illustrated with the similarity in trends of numbers of mothers who had practised and opinionated exclusive breastfeeding. Studies in South Africa and Tanzania have also found discrepancy between mothers' perceptions and practices (30;41). Related to this is the finding that an infant's crying, interpreted as an unsatisfied baby by the mother, was the commonest reason for the first complementary feeding event. Other studies have also reported infant's crying as a reason for introduction of complementary feeds(30;49).

### 6.2.9 Persons of influence in mothers' infant feeding decisions

Both in the rural area and the urban area, mothers mainly made their own decision on when to introduce other feeds as was similarly found in Tanzania and South Africa(30;58). Apart from the mother themselves, elderly family or community members were more commonly of influence on the first complementary feeding event than health workers. However, health workers were reported as the main influence on mothers' perceptions. Traditionally elderly family/community members are culturally respected and thus have a say in the mothers' infant feeding choices. However different from a study done in Sudan (29) influence of elderly women was prominently reported in the urban area than rural area. The difference in the Sudanese study and our study is that most of the urban mothers in this study were unemployed and not involved in any income generating activities and therefore could have had ample time to interact more with other community members. In the rural area, as was also observed by the researcher, mothers spent a lot of time working in the fields and were staying less at home, than women in the urban area.

### 6.2.10Alternative caregivers

Involvement of the elderly women in the infant's life was also alluded to through the finding that grandparents were the commonly used alternative caregivers often due to mothers' engagement in household work. However, more infants in the rural area were being left with alternative caregivers than in the urban area. This could be that in the rural area household chores, which are mainly the mother's responsibility, are more demanding than in the urban area. Apart from cookery and house cleaning household chores also include fetching water from a water point; fetching firewood from the bush; going to the milling centre to process maize grains into flour. In the rural area water and firewood could be fetched from relatively far away places; unlike in the urban area where water was obtained closer to the people's homes; and firewood was often bought from open markets and kiosks within the people's compounds and not fetched from the bush.

### 6.2.11 Weaning reasons

The most common reasons for weaning were: infant being sufficiently grown and prevent infant from becoming malnourished. Both in the rural and urban area, mothers mainly made their own plans on when to wean the infant. However, health workers were commonly of more influence than elderly community members in the weaning intentions among the mothers who did not make their own decisions on the infant's weaning. Similarly in studies in Tanzania, South Africa health workers were reported as being of more influence than any other person in the mothers' perceptions. However the person of influence for the mother's decision to introduce other feeds was not investigated in either of these studies.

### 6.2.12 Awareness and perceptions about MTCT

More mothers from the rural area were aware about MTCT and PMTCT than from the urban area. In our study we did not assess mothers' awareness of the risk associated with each of the methods of MTCT. Therefore the awareness discussed in this study is not a fully complete measure of the mothers' awareness on issues of MTCT. The higher awareness of MTCT and PMTCT in the rural area than the urban area could

possibly be due to the fact that a PMTCT programme has been going on in the Lungwena health centre, which is the health facility which serves the rural area. Although one would expect that people being informed about MTCT would also be informed about PMTCT, in this study not all mothers who were aware about MTCT were also aware about PMTCT. Taking into account that mothers' major source of infant feeding related perceptions and information are health workers, as found in this study and other studies(30;33;41;58;59) ; this awareness gap could be pointing out to the quality of education on MTCT issues and health workers knowledge on these issues.

Related to this is also the finding that among reasons mothers gave for the choice to breastfeed in the event that they were found to be HIV positive were based on a partial misconception, like 'child is already born with HIV'. Studies in South Africa and Tanzania have found that also health workers knowledge on MTCT issues to be lacking (30;49). This might also be the case for the health workers in our study area, given that our study area settings might not be very different from the other studied areas. However we can not conclude such as we did not assess health workers awareness on issues of MTCT in this study.

The majority of the mothers said they would not breastfeed if found HIV positive. Chopra et al in a study in South Africa found similar results (30;49). However, in that study a PMTCT program which was promoting replacement feeding had been going in that studied area and the results might not be have been representative of ordinary communities in that setting. In our study, more of the mothers who would breastfeed if HIV positive, were from the rural area. This can be possibly explained with the reasons given by mothers themselves, which were to have infant's nutrition needs met; and that their breast milk was affordable and available. This also has to do with the fact most of the rural mothers were economically worse of than the urban mothers.

Negative community reaction of taking non-breastfeeding mothers as HIV positive was alluded to by mothers both in the rural and urban area. In addition, a community tendency of being sympathetic was also expressed by the rural mothers, while the urban mothers alluded to a community perception of such mothers being modern. Association of non-breastfeeding mothers to being HIV positive has been reported in other African studies of bigger magnitude than what was found in this study(60;61). Nevertheless our findings lead us to say that non-breastfeeding is unnatural and does elicit some reactions in the community although not always associated with HIV/AIDS. The association of non-breastfeeding mothers to being modern is a signal of unfavourable breastfeeding practices which may come along with urbanisation. Studies in Tanzania, Sudan, have been related to shorter duration of breastfeeding among affluent and modern urban dwellers (29;62).

The finding that not all mothers are fully aware of issues of MTCT; and that some have wrong information about MTCT; in the study area which lies in one of the districts with the highest HIV prevalence in Malawi, is disturbing(63). Present infant feeding recommendations are based on the supposition that the responsibility for choosing the appropriate infant feeding option for HIV positive mothers rests with the mothers themselves; and implies that the mother will be given enough information to make an informed choice(64). Therefore it is critical that mothers who are the decision makers are well informed.

### 6.2.13 Infant's nutritional status

Rate of being underweight or stunted among the infants was found to be 12.6%. Wasting was found to be 6.6%. All the three forms of malnutrition: stunting, wasting, and being underweight were highest in infants between 4-6 months and 8-10 months. Similarly, in the Lungwena 1995-96 cohort study it was found that being underweight and wasting were highest at 6 but also at 18 months. However, the malnutrition rates by end of infancy in the Lungwena study were much higher than in our study as follows: being underweight was 40%; wasting was 4%; stunting was 70%(65).

All the three forms of malnutrition were much higher among infants who had not been exclusively breastfed at 4 months than those who had been. This was expected given the nutritional characteristics of breast milk. However, it is also interesting to note among those who had been exclusively breastfed that still some got malnourished. However, we did not analyse further to find out the ages or other factors about those who were malnourished but had been exclusively breastfed at 4 months. Nevertheless this could be pointing out to poor nutritional quality of foods which are later added in the infant's diet.

At 4 -6 months complementary feeds are supposed to be introduced an infant's diet to meet 20% of the infant's nutritional requirements(14). Whilst as at 8-10 months complementary foods are supposed to be increased to in an infant's diet. In view of this, the timing of the peak rates for the three forms of malnutrition we studied could be explained by the poor nutritive value of the complementary feeds and family feeds. Stunting, wasting and under weight levels were rapidly increasing with increase in age among infants in the 2 - 6 months age group. This was similarly the case in the 1995-96 Lungwena study where incidence of stunting was highest in the first 6 months(65). This could be possibly explained by declining exclusive breastfeeding rates with increase in age.

***Stunting***

In our study we found stunting to be prevalent among infants less than 2 months old. The prevalence of stunting in the first two months of life among the studied infants might be a reflection of both insufficient intrauterine nourishment and inadequate nourishment due to early complementary feeding after birth as earlier alluded to. In cohort study previously done in the rural community of our study area in 2000, stunting was found to be present at birth(66). The rate os stunting we found in our study is lower than the rate they found (49%) in the 2000 Malawi DHS(1). However, the DHS rate includes stunting rates for children up to 5 years.

***Underweight***

Rates of being underweight in the different age groups were similar to the stunting rates. This could partly be due to that measurement of being underweight (weight-for-age) is influenced by both stunting (height-for-age) and wasting (weight-for-height). The 2000 Malawi DHS had found the rate of being under weight among under fives to be 49%.

***Wasting***

Wasting (weight-for-height) is a measure of acute malnutrition. Rate of wasting was relatively lower than the stunting rate. The low rates could also be possibly due to the fact that wasting might have been obscured by the high stunting levels. For instance a

stunted short infant may have seemingly a normal weight based on the 'stunted height' when if other factors like their age and height were inconsideration, they could have been wasted. However, compared to the 2000 Malawi DHS the rate of wasting (6.6%), the rate of wasting we found was high.

### 6.2.14 Factors associated with malnutrition

***Food shortage***

In logistic analysis, food shortage was found to be a predictor of stunting and not being underweight (weight for age). Association of food security to malnutrition is well known. However, it is interesting to note that food shortage was not associated with acute malnutrition (either being underweight or wasted) either in bivariate or multivariate analysis. This could possibly be explained by the fact that experiencing food shortage did not automatically mean that the household did not eat anything during that time. Through other coping mechanisms like food for work, asking for food from those better off, households would still find something to eat.

***Living in the rural area vs urban area***

Living in the rural area emerged as one of the predictors of both stunting and being underweight. There were some socio-economic attributes, characteristic of either the rural or urban area, which were confounding to the attribute of living in the rural or urban area. For instance, illiteracy and giving birth outside a health facility, common attributes of the rural-based mothers, were associated with nutritional status in the bivariate analysis. But, this association was lost in the multivariate analysis.

***Mother's occupation***

In the bivariate analysis, mother's occupation like farming, small-scale trading was found to be a risk factor for malnutrition. This could possibly be due to the fact that having some kind of occupation did not mean the mother was relatively economically better off. For instance, most of the rural mothers had at least an occupation of subsistence farming. However, half of them were not even obtaining enough produce to meet their own food needs. Whilst as the urban mothers were unemployed but had their husbands earning relatively more income. Hence that's why mother's occupation was no longer significant in multivariate analysis for determinants of infant's nutritional status.

***Marital status***

In bivariate analysis, infants of single, divorced or widowed rural-based mothers were more at risk of stunting. A possible explanation of this could be that: In addition to such mothers' role as the infant's caretaker they also have lesser manpower with which to share the role of securing food for the household either through farming or small-scale trading. This likely makes the household prone to food insecurity. Mothers' marital status association with malnutrition was lost in multivariate analysis; much probably because of the confounding relationship it may have to food security.

# Chapter seven: Conclusion and Recommendations

## 7.1 Conclusions

### 7.1.1 Breastfeeding and complementary foods

Breastfeeding is the most common infant feeding method for all mothers both in the rural and urban area. There is early initiation of breastfeeding regardless of the place of giving birth. Delays in initiation time do not exceed 5 hours. Discarding of colostrum and pre-lacteal feeding are uncommon practices. Giving herbal water in the first week of an infant life is a cultural norm widely practised in the rural area than the urban area.

Exclusive breastfeeding is generally not widely practised; only 3.4% of the infants 6 months old had been exclusively breastfed. Exclusive breastfeeding is more uncommon in the rural area than the urban area. In the rural area there are smaller differences in exclusive breastfeeding rates among infants 2 – 6 months old. In the urban area the exclusive breastfeeding rates are much higher in infants 2 months old than infants 6 months old. Mothers who are either literate or give birth in a health facility or live in the urban area are more likely to exclusively breastfeed until the sixth month. Nevertheless, introduction of other feeds to the infant depends on a mother's interpretation of an infant's condition whether infant is hungry-inferred through infant's crying- or thirsty.

Water is introduced much earlier to infants in the rural than urban area. Feeds are introduced relatively late to infants both in the rural and urban area. Complementary foods were maize based. Similarly maize based porridges were perceived as the appropriate complementary feeds to be introduced first to infants both among rural and urban mothers. Family foods were mostly introduced after the $8^{th}$ month, which is the recommended time. Complementary feeds were introduced earlier than the right timing in the mother's opinion. Mothers are more aware of the infant related than maternal related health benefits of breastfeeding.

Grandmothers and other elderly women are more involved in infant feeding than mothers' peers or husbands both in the rural and urban communities. Grandmothers are commonly used as alternative care givers when mothers are busy. In addition to other elderly women in the community they also influence mothers' decision on the timing of introduction of complementary feeds more than health workers would. On the other hand, health workers are influential in the mothers' perceptions of the right timing for introduction of complementary feeds.

Most mothers are aware of MTCT. However not all of them are aware of PMTCT methods. Misconceptions about MTCT are prevalent among some of the mothers in the study area. Most mothers would prefer not to breastfeed if they were found to be HIV positive. Of those who would prefer to breastfeed, they would prefer such because breast milk is the best food for an infant.

### 7.1.2 Malnutrition

Rates of stunting and being underweight were higher than the rate of wasting among the studied infants. However according to WHO classification for public health surveillance the wasting and stunting rates found are above the 'normal' rates of in a population. All the three forms of malnutrition were higher in infants between 4-6 months and 8-10 months old; and the rates were also significantly higher for urban mothers than rural mothers.

## 7.2 Recommendations

### 7.2.1. Focus of interventions

Given the low rates of exclusive breastfeeding found in this study, there is a need to work more on promotion of exclusive breastfeeding. However, more emphasis should be on promotion of exclusive breastfeeding in the rural area. The higher rates of malnutrition and poorer socio-economic conditions in the rural area are evidence to this.

The relatively smaller difference in rates of predominant breastfeeding than exclusive breastfeeding between the rural and urban community, shows that it is water-based fluids which are introduced much earlier compared to the feeds. Therefore exclusive breastfeeding promotion messages should emphasize more the timing for introduction of fluids including 'cultural' herbal drinks. Messages should also be specific enough to clarify mothers' questions, for instance, about a crying child.

Given the high number of home births and involvement of elderly community members in infant feeding; elderly women can be used as an entry point for community based exclusive breastfeeding promotion. In this regard, elderly women can be provided with basic training on appropriate infant feeding practices and then make arrangements that they follow up pregnant women in their communities until 6 or more months after giving birth they give birth. During the followed up time the elderly women can offer support to the mothers. Use of elderly women would be a sustainable means of providing community based support to lactating mothers as the formal health care is already resource constrained.

Exclusive breastfeeding was associated with demographic and social-related factors like place of birth, mother's literacy and food security. Therefore breastfeeding promotion can be integrated into socio-development programs like adult literacy schools or micro agriculture, as one way of improving social factors which favour exclusive breastfeeding; but at the same time using such kind of programs as channels of communication for exclusive breastfeeding promotion. In the same regard, promotion of use of health care facilities for child birth should be prioritized.

Misconceptions on MTCT issues and the fact not all mothers aware of MTCT were aware of PMTCT points out to the need for improved education on MTCT issues for mothers. As a starting point, knowledge needs assessment for health workers who are

the source of information for the mothers has to be done; and training to meet health workers knowledge gaps on MTCT issues conducted.

### 7.2.2 Areas for future research

There is need for baseline data on issues of breast health and breastfeeding management like infants' positioning on feeding, which are issues we did not look into in this study.

Research should focus on ways of improving nutritive value of the complementary feeds presently being used, given the high prevalence of malnutrition and the timing of malnutrition.

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# APPENDIX 1

**QUESTIONNAIRE ON INFANT FEEDING PRACTICES AND PERCEPTIONS AMONG RURAL AND URBAN MOTHERS.**

| IDENTIFICATION | |
|---|---|
| VILLAGE NAME: | |
| T/A: | |
| NAME OF HOUSEHOLD HEAD:<br>Surname<br>First Name<br>Middle Name<br>Other Name | |
| NAME OF INFANT: | |
| DATE OF BIRTH OF INFANT:<br>(Ask for health card if available) | H/Card Reported (Tick) |
| NAME OF CAREGIVER: | |
| QUESTIONNAIRE NUMBER: ; ; | Rural/Urban; Village; H/Hold no. |

## ***SECTION 1: DEMOGRAPHIC DATA***

HOUSEHOLD COMPOSITION
Now I will ask you some questions about your household

| USUAL RESIDENTS | RELATIONSHIP TO H/HOLD HEAD | SEX | AGE | MAIN PROFESSION | MARITAL STATUS | LITERACY | EDUCATION |
|---|---|---|---|---|---|---|---|
| What are names of pple living in this h/hold? | What is relationship of (name) to h/hold head? | Is (name) male or female? | How old is (name) | What is (name)'s profession or activity? | What is (Name)'s marital status? | Can (name) read or write? | What is (name) highest level of education? |
| **Question 1** | **Q 2** | **Q 3** | **Q 4** | **Q 5** | **Q 6** | **Q 7** | **Q 8** |
| | | | | | | | |
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| | | | | | | | |
| | | | | | | | |

CODES OF ANSWERS FOR Q 7: Yes 1
No 2

CODES OF ANS. FOR Q 2

Head of H/Hold 1
Wife 2
Son or daughter 3
Son/daughter-in-law 4
Grandchild 5
Parents in-law 6
Brother or sister 7

CODES OF ANS FOR Q 3

Male 1
Female 2

CODES OF ANS. FOR Q 5

Small scale farmer 1
Small scale fisherman 2
Big scale fisherman 3
Big scale farmer 4
Petty trader 5
Paid labourer 6
Commercial farmer 7
Paid professional 8
Student 9
Unemployed 10
Other(specify) 11

CODES OF ANSWERS FOR Q 6

Never married 1
Married/Cohabiting 2
Divorced/Separated 3
Widow 4

CODES OF ANS. FOR Q 8

Primary 1-4 1
Primary 5-8 2
Junior sec 3
Senior sec 4
Post sec 5
Adult school 6

MARITAL STATUS

| NUMBER OF CO-WIVES | RANK | RESIDENCE | TIME ALLOCATION |
|---|---|---|---|
| What are the names of the wives your husband? (Starting with yourself) | Is (name) first; second; or third or fourth; or fifth… wife? | Does (name) live in this household? | How much time does your husband spend with (name) within a month? |
| **Q 9**<br><br>If there are no any other wives except respondent; skip Q 10, 11, Go to Q12. | **Q 10** | **Q 11** | **Q 12**<br><br><u>Codes of Answers</u><br>all dys of the month 1<br>3-2 wks in a month 2<br>1 wk or less in a month 3<br>less than a month in a yr 4<br>Other (specify) 5 |
| | | | |
| | | | |
| | | | |
| | | | |

## ***SECTION 2: SOCIO-ECONOMIC DATA***

13. Does your household have other sources of income apart from the main activities of your household members?
Yes 1
No 2

14. If yes specify _____
_____

15. Do you have the following property?

| | Yes | No |
|---|---|---|
| Car | 1 | 2 |
| Refridgerator | 1 | 2 |
| TV | 1 | 2 |
| Radio | 1 | 2 |
| Mattress (no.)_____ | 1 | 2 |
| Mosquito nets | 1 | 2 |
| Blankets | 1 | 2 |
| Bicycle | 1 | 2 |
| Motorcycle | 1 | 2 |
| Ox-cart | 1 | 2 |
| Boats | 1 | 2 |

16. What is the main material for the roof of your house?
Grass thatch 1
Iron sheets/tiles 2
Other (specify) 3

17. What is the main source of drinking water for the household?
Tap water 1
Borehole 2
Protected well 3
Unprotected well 4
River/Stream 5
Other(specify) 6

18. How long does it take to walk and come back?_____(In min)

19. How do you store drinking water?_____

20. Does this h/hold have a latrine? Yes 1
No 2

## ***SECTION 3: FOOD SECURITY DATA***

21. Do you have the following livestock?

| | Yes | No |
|---|---|---|
| Cattle(no.)_____ | 1 | 2 |
| Goats (no)_____ | 1 | 2 |
| Chickens (no)____ | 1 | 2 |
| Other (specify, include number) | | |

22. What are the main sources of food in your household?
Direct harvest from garden 1
Purchasing 2
Battering of food for work 3
Food aid 4
Food for work projects 5
Other (specify) 6

23. If more than one source has been chosen, rank them in order? First main source_____
Second main source_____

24. Do you have any agricultural plots? Yes 1
No 2

If No, Go to Q31.

AGRICULTURAL PRODUCTION

We would like to ask you some questions about crops produced your agricultural field.

| PLOT NUMBER | CROPS | AMOUNT PRODUCED |
|---|---|---|
| How many agricultural plots do you have? List each plot on each row separately, beginning with plot number 1 | What type of crops does the h/hold grow on the plot? | How many 50kg bags did the h/hold produce of the crop? |
| **Q 25** | **Q 26** | **Q 27** |
| | | |
| | | |
| | | |
| | | |
| | | |

28. Which month of the year do you harvest maize?_____

29. Which month of the year does your harvested food get finished?_____

30. Which month does your household start facing food shortages?_____

If household has agricultural plots; Skip 31, Go to 32.

31. Which months of the year do you face food shortages?_____

## ***SECTION 2: BREASTFEEDING PATTERNS AND PRACTICES***

Now I want to ask you some questions about breastfeeding

| | | | |
|---|---|---|---|
| 32. | Where did you give birth? | Health facility 1<br>At home with TBA 2<br>TBA's place 3<br>Other(specify) 4 | |
| 33. | Upon birth of the child, after what length of time did you start breastfeeding? | <1 hour 1<br>1Hr- 5Hrs 2<br>Half day 3<br>1 day 4<br>2-3 days 5<br>Other(specify) 6 | |
| 34. | If you gave breast milk immediately did you give the first thick yellow milk that came | Yes 1<br>No 2 | |
| 35. | Was there anything given to the baby before putting it to the breast? | Yes 1<br>No 2 | |
| If no, skip 36, go to 37 | | | |
| 36. | What was it? | Plain water 1<br>Glucose water 2<br>Herbal water 3<br>Milk formula 4<br>Cow milk/powdered 5<br>Fruit juice 6<br>Other(specify) 7 | |
| 37. | In the first few days after delivery before your milk began flowing reguraly, did you give the baby anything to drink other than breast milk? | Yes 1<br>No 2 | |
| If no skip 38, go to 39 | | | |
| 38. | What was the drink given? | Cow milk/powdered 1<br>Plain water 2<br>Sugar or glucose water 3<br>Gripe water 4<br>Sugar/Salt water solution 5<br>Fruit juice 6<br>Infant formula 7<br>Tea/Infusions 8<br>Honey 9 | |

| | | | |
|---|---|---|---|
| | | Other (specify) 10 | |
| 39. | Thereafter, during the first three weeks, how frequent were you breastfeeding the baby? | On demand 1<br>Every 2-3 hours 2<br>Every 4-5 hours 3<br>After every 6hrs or more 4<br>Other(specify) 5 | |
| 40. | Presently, what foods and fluids are you feeding the child? | Food Item Yes No<br>Plain Water 1 2<br>Glucose water 1 2<br>Tea 1 2<br>Herbal water 1 2<br>Infant formula 1 2<br>Breast milk 1 2<br>Cows' milk 1 2<br>Fruit juice 1 2<br>Ufa woyera porridge 1 2<br>Mgaiwa porridge 1 2<br>Mgaiwa porridge with nsinjiro/ milk/oil added 1 2<br>Cerelac 1 2<br>Nsima 1 2<br>Fish sauce 1 2<br>Bean sauce 1 2<br>Meat sauce 1 2<br>Vegetable 1 2<br>Fish 1 2<br>Beans 1 2<br>Meat 1 2<br>Mangoes 1 2<br>Bananas 1 2<br>Other (specify) | |
| If no other food apart from breast milk is being given to the baby go to 47 | | | |
| 41. | What was the first additional food/fluid other than (breast milk) that you introduced to the baby? | _____ | |
| 42. | When was it introduced | Within the first three weeks 1<br>Between 4th wk – 8th wk 2<br>During the third month 3<br>During the fourth month 4 | |
| 43. | What was the reason for introducing the fluid/food? | Reasons related to the mother<br>Pregnancy 1<br>Illness (specify) 2<br>Not enough milk 3<br>Breast feeding difficult 4<br>Work situation 5<br>Death of child 6<br>Custom/taboos 7<br>Advice from pple around 8<br>Other (specify) 9<br><br>Reasons related to the child<br>Cried too much 9<br>Illness of the child (specify) 10<br>Breast milk not enough, infant not satisfied 11 | |
| 44. | Was your decision to introduce food/fluids dependent on some people | Yes 1<br>No 2 | |
| 45. | If yes who was it? | Health worker 1<br>Friends/peers 2<br>Elderly community member/ family member 3<br>Husband 4<br>Other(specify) 5 | |
| 46. | How frequently were you breastfeeding after first introducing other foods/fluids compared to the first three weeks? | On demand 1<br>Every 2-3 hours 2<br>Every 4-5 hours 3<br>After every 6hrs or more 4<br>Other(specify) 5 | |
| 47. | How frequently are you breastfeeding now compared to the first three weeks? | On demand 1<br>Every 2-3 hours 2<br>Every 4-5 hours 3<br>After every 6hrs or more 4<br>Other(specify) 5 | |
| If mother has stopped breastfeeding skip 48 and 49, go to 50. | | | |

| | | | |
|---|---|---|---|
| 48. | Have you already decided when you will completely stop breastfeeding (wean) the child? | Yes 1<br>No 2 | |
| 49. | If yes, when | When the child is:<br>Less than 6 months old 1<br>6- 11 months old 2 1 year – 1.5 years old 3<br>More than 24 months old 4<br>Other(specify) 5 | |
| 50. | What were the reasons for the choosing to wean at that specific time? | <u>Reasons related to the mother</u><br>Pregnancy 1<br>Illness (specify) 2<br>Not enough milk 3<br>Breast feeding difficult 4<br>Work situation 5<br>Death of child 6<br>Custom/taboos 7<br>Other (specify) 8<br><br><u>Reasons related to the child</u><br>Cried too much 9<br>Illness of the child (specify) 10 | |
| 51. | Is (Was) your decision dependent on influence from some people? | Yes 1<br>No 2 | |
| 52. | If yes, who? | Health worker 1<br>Friends/peers 2<br>Elderly community member/ family member 3<br>Husband 4<br>Other(specify) 5 | |

## ***SECTION 3:INFANT FEEDING DURING MOTHER OR INFANT SICKNESS.***

| | | | |
|---|---|---|---|
| 53. | When was the last time that the child was sick? | Less than a week ago 1<br>1-2 weeks ago 2<br>3-4 weeks ago 3<br>More than 1 month ago 4<br>Others(specify) 5 | |
| 54. | What did she/he suffer from? | Diarrhoeal related illness 1<br>Respiratory Tract Infections 2<br>Malaria 3<br>Others (specify)_____ 4 | |
| 55. | What were the main foods/fluids you fed the infant at this time? | Breast milk 1<br>Water 2<br>Ufa woyera porridge 3<br>Mgaiwa porridge 4<br>Mgaiwa porridge with nsinjiro/milk/oil added 5<br>Tea 6<br>Other(specify) 7 | |
| 56. | What special food did you give to the infant because of the illness | Rice porridge 1<br>Yoghurt 2<br>Ufa woyera porridge 3<br>Mgaiwa porridge 4<br>Mgaiwa porridge with nsinjiro/milk/oil added 5<br>Tea 6<br>Other(specify) 7 | |
| 57. | Have you been sick since you gave birth to the child? | Yes 1<br>No 2 | |
| If no, go to 61 | | | |
| 58. | If yes what did you suffer from? | Malaria 1<br>Diarrhoea 2<br>TB 3<br>Others (specify) 4 | |
| 58. | During this time, what did you feed the child? | Rice porridge 1<br>Yoghurt 2<br>Ufa woyera porridge 3<br>Mgaiwa porridge 4<br>Mgaiwa porridge with nsinjiro/milk/oil added 5 | |

| | | | |
|---|---|---|---|
| | | Tea 6<br>Other(specify) 7 | |
| 59. | During this time were you breastfeeding? | Yes 1<br>No 2<br>Wet Nursing 3<br>Others(specify) 4 | |
| 60. | If yes, how was your breastfeeding frequency? | Did not change 1<br>Less than in normal times 2<br>More than in normal times 3<br>Other(specify) 4 | |
| 61. | How many times have you been sick over the past 2 months | None 1<br>Once 2<br>Twice 3<br>Thrice 4<br>Four time or more 5<br>Other(specify) 6 | |
| 62. | If married, how many times has your husband been sick over the past 2 months | None 1<br>Once 2<br>Twice 3<br>Thrice 4<br>Four time or more 5<br>Other(specify) 6 | |
| 63. | How much time do you spend with the child in a day? | The whole day 1<br>20-23 hrs in a day 2<br>12 hrs in a day 3<br>Few hours in a day 4<br>Other(specify) 5 | |
| 64. | Who is taking care of the child if you are not present? | Siblings 1<br>Father 2<br>Neighbor 3<br>Grandparent 4<br>Housemaid 5<br>Other (specify) 6 | |
| 65. | Where are you when the child is not with you? | At work 1<br>Working in the field 2<br>Taking care of other 3<br>children/family 4<br>Other(specify) 5 | |

## ***SECTION 4:KNOWLEDGE AND ATTITUDES ON BREASTFEEDING***

| | | | |
|---|---|---|---|
| 66. | How soon do you think a baby should be put to the breast? | Immediately after birth 1<br>Half a day after birth 2<br>One or more days after birth 3<br>When the yellow milk is gone4<br>Other (specify) 5 | |
| 67. | Why? | <u>Reasons related to infant's nutrition:</u><br>Breast milk is good food for the baby 1<br>For the baby to have Colostrum 2<br><br><u>Reasons related to mother's wellbeing</u><br>It helps prevent swelling of breasts 3<br><br>Other(specify) 4 | |
| 68. | How soon after birth should a baby be given water? | First day 1<br>First week 2<br>First month 3<br>Six or more month 4<br>Other (specify) 5 | |
| 69. | In your opinion what should be the baby's first additional food other than breast milk? | Ufa woyera porridge 1<br>Mgaiwa porridge 2<br>Mgaiwa porridge with nsinjiro/ oil/milk 3<br>Glucose water 4<br>Herbal water (specify herbs) 5<br>Milk formula 6<br>Cow's milk 7<br>Cerelac 8<br>Fruit juice 10<br>Others (specify) _____ 11 | |
| 70. | Why do you think that, that should be the first food? | | |
| 71. | How soon after birth should this first additional | 1st month 1 | |

| | | | |
|---|---|---|---|
| | food be given? | 2-3 months 2<br>4-5 months 3<br>6 months or 1 year 4 | |
| 72. | From where have you learned this? | Health worker 1<br>Elderly relative 2<br>Friend 3 | |
| 73. | In your opinion should a mother breastfeed when the child has diarrhoea | Yes 1<br>No 2 | |
| 74. | If yes, why | Breast milk is the best food for infant even when it is sick 1<br>Other (specify) 2 | |
| 75. | If no, why not | It accelerates diarrhoea 1<br>Other(specify) 2 | |
| 76. | What are the benefits of breastfeeding | Delays onset of another pregnancy 1<br>Reduces risk of child being infected from diarrhoeal diseases 2<br>Other(specify) | |
| 77. | Are there women who do not breastfeed at all in this community? | Yes 1<br>No 2 | |
| 78. | If yes, what are the reasons? | Mother being HIV positive 1<br>Mother being sick 2<br>Mother being unable to produce breast milk 3<br>Other(specify) 4 | |
| 79. | What do people say about a woman who does not breastfeed | The woman is HIV positive 1<br>The woman is modern 2<br>Other(specify) 3 | |
| 80. | In your opinion do you think mothers in this community do not give the child any food or fluid, including water except breast milk in the first four months? | Yes 1<br>No 2 | |
| 81. | If no, What are the difficulties they face in executing this? | Contradicting advice from family members and friends 1<br>Lack of free time as mothers have to attend to work 2 | |

## ***SECTION 4: KNOWLEDGE AND ATTITUDES ON AIDS AND MTCT***

Now I will ask you some questions about HIV/AIDS and MTCT.

| | | | |
|---|---|---|---|
| 82. | How is HIV transmitted from one person to another | Sexual intercourse 1<br>By using objects used by an infected person 2<br>Blood transfusion 3<br>Frm infected mother to child 4 | |
| Skip 83 if 4 has been given as one of the answers to question 70 | | | |
| 83. | Can an HIV infected mother pass the virus to her child? | Yes 1<br>No 2 | |
| If NO, Skip 84 and 85 | | | |
| 84. | In what ways can a mother pass the HIV virus to her child | During pregnancy 1<br>During labour 2<br>Through breastfeeding 3 | |
| 85. | How can the transmission of HIV virus from mother to child be prevented? | Through medication 1<br>Avoidance of breastfeeding 2<br>Exclusive breastfeeding 3<br>Other(specify) 4 | |
| 86. | Do you think a mother who has HIV/AIDS should breastfeed? | Yes 1<br>No 2 | |
| 87. | If yes, why | Because breast milk is the best food for infant 1<br>Because breast milk is affordable 2<br>To prevent people from knowing that they | |

| | | | |
|---|---|---|---|
| | | are HIV positive and discriminating them 3<br>Other(specify) 4 | |
| 88. | If no, why not | To reduce risk of mother to child HIV transmission 1<br>Other (specify) 2 | |

***SECTION 5: INFANT'S ANTHROPOMETRIC MEASUREMENTS***

Weight _____kg
Height_____cm

# APPENDIX 2

**CONSENT FORM (VERBAL) FOR PARTICIPATION IN THE STUDY ON INFANT FEEDING PRACTICES IN AN AREA WHERE HIV/AIDS IS PREVALENT**

**Dear prospective participant:**

My name is Penjani Kamudoni and I am a student researcher studying at University of Oslo in Norway. I am visiting this area in order to interview mothers/caregivers of children under one year of age.

The reason for this is that many children in Malawi are malnourished and therefore they are more susceptible to diseases. In order to prevent this, it is important to understand what factors are leading to malnutrition in these children. Your answers can therefore help the health workers and programme planners to better understand how you feed your children, what you know about infant feeding, and your views on infant feeding; this can help them to improve and plan better ways of addressing the problem of malnutrition. Your answers will also be used to write a research paper as a part of my university degree.

If you agree to participate in this research, I will ask you questions about your family background, the situation in your household, general feeding and breastfeeding practices, HIV/AIDS and mother-to-child-transmission. I will also measure the weight and height of your child.

Your participation is voluntary and you do not have to answer if you don't want to. You can withdraw from the interview at any time if you wish to, without this having any negative consequences on you. Your name or your child's name will not be used in any way after the interviewing is finished. The information you give me will be treated with confidentiality.

Signature / Thumb print: ____

# APPENDIX 3

***CONSENT FORM (THUMB PRINTING) FOR PARTICIPATION IN THE STUDY INFANT FEEDING PRACTICES IN AN AREA WHERE HIV/AIDS IS PREVALENT IN CHICHEWA***

**Kwa amayi omwe angakonde kutenga mbali mu mkafukufuku:**

Ine ndine Penjani Kamudoni, ndabwera kuno ngati wophunzira wa kusukulu ya zaumoyo yaku Norway kuti ndidzachite kafukufuku wa momwe azimayi amadyetsera ana akhanda osapitilira chaka chimodzi.

Cholinga cha kafukufuku ameneyu ndichakuti ana ambiri kwathu kuno ndi onyetchera, pa chifukwa ichi amagwida ndi matenda osiyanasiyana pafupipafupi zomwe zimadzetsa mavuto osiyanasiyana paumoyo wao, ndikubwezeretsa thanzi lao mbuyo. Pofuna kuthetsa vuto ili, nkofunika kuti akulu akulu azaumoyo adziwe za momwe azimayi amadyetsera ana ao. Choncho mayankho anu ku mafunso amene ndikufunseni adzathandiza kukwanilits zolinga zimenezi. Kuonjezera apo, mayankho anu adzagwiritsidwa ntchito polemba lipoti lomwe lili ngati gao lomodzi la mayeso anga ku sukulu ya zaumoyo.

Ngati muvomere kutenga mbali mkafukufukuyu, dzikufunsani mafunso okhudzana ndi zinthu izi: banja lanu, njira zomwe zomwe mumadyetsera mwana wanu, komanso maganizo anu pa nkhani ya Edzi. Kuonjezera apo, ndimuyesa mwana wanu sikelo ndi msinkhu.

Muli ndi ufula ovomera kutenga mbali mkafukufukuyu kapena kukana. Ndipo simuyimbidwa mlandu ulionse chifukwa chokana. Ndipo ngakhale mutavomera kutenga mbali muli ndi ufulu osintha maganizo ndikusiya ngati mwafuna kutero. Dzina lanu kapena la mwana silikaululidwa kapena kutchulidwa kwina kuli konse, kupatula pa nthawi ino pofuna kulankhula nanu.

Chidindo/Siginetcha ____